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TELEPHONE ENGINEER AND MANAGEMENT

The NATIONAL TELEPHONE MAGAZINE

devoted to

THE BEST INTERESTS OF THE ENTIRE TELEPHONE INDUSTRY —OPERATING MEN AND MANUFACTURERS

★

CONTINUOUS SINCE 1909

ATTEND THE 45TH ANNUAL CONVENTION OF THE UNITED STATES INDEPENDENT TELEPHONE ASSOCIATION— Stevens Hotel, Chicago, October 14-15-16-17

OCTOBER 15, 1941

Invitation

to all independent telephone men

The 45th

Annual Convention of the

UNITED STATES INDEPENDENT TELEPHONE ASSOCIATION

will be

One of the most important meetings the Association has ever held - - - -

ALL INDEPENDENT TELEPHONE PEOPLE ARE INVITED AND URGED TO BE PRESENT

STEVENS HOTEL — CHICAGO — OCTOBER 14-15-16-17

PROMINENT Speakers—Prominent Subjects such as Priorities, Defense, and Taxes—make it imperative that EVERY Independent operating man attend this Convention. This is YOUR Annual Convention and we expect every Independent to be present.

EXHIBITS of the manufacturers and suppliers are an education in themselves. Many new products will be shown. This year will see the largest number of exhibitors ever to exhibit in a convention held by our industry.

UNITED STATES INDEPENDENT TELEPHONE ASS'N.

616 SOUTH MICHIGAN AVENUE, CHICAGO

TELEPHONE ENGINEER

MANAGEMENT · ENGINEERING · MAINTENANCE

"THE NATIONAL TELEPHONE MAGAZINE"
FOUNDED 1909

VOLUME 45—No. 10

OCTOBER
1941

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The Staff

RAY W. SMITH, Editor
ROY P. SMITH, Adv. Manager
R. C. BURDEN, Technical Editor

PUBLIC LIBRARY
OCT 13 1941
DETROIT

Crapo HIGH-TENSILE LOW-RESISTANCE WIRE

Wherever Telephone Men Meet, You'll Hear This Story Repeated Again and Again!

LEICH SERVICE

National Convention
October 14th to 17th
Hotel Stevens
Chicago

This year, as in previous years, all Leich sales representatives and executives will be on hand to greet you at the National Telephone Convention, October 14, 15, 16 and 17th in

Rooms 2411-2412-2413-2414.

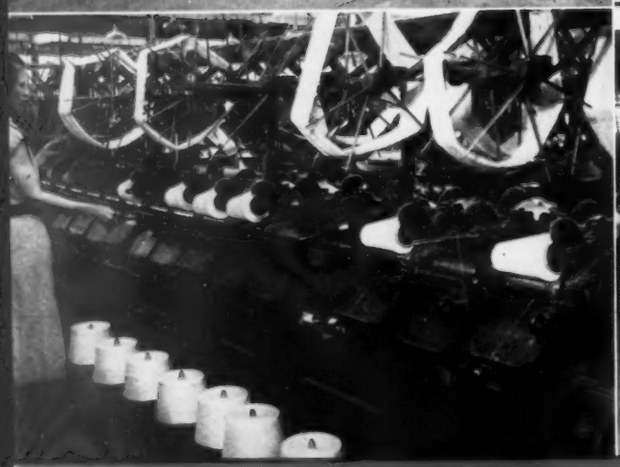
Here you will find neither "uncertainty" in your welcome nor any "shortage" in hospitality. It is our sincere hope that you will assign an "A-1 Preference Rating" to your visit to Leich Exhibit Rooms.

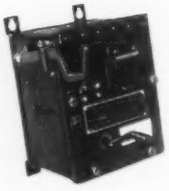
Leich Sales Corporation

427 West Randolph Street

Chicago, Illinois

KELLOGG keeps 'em





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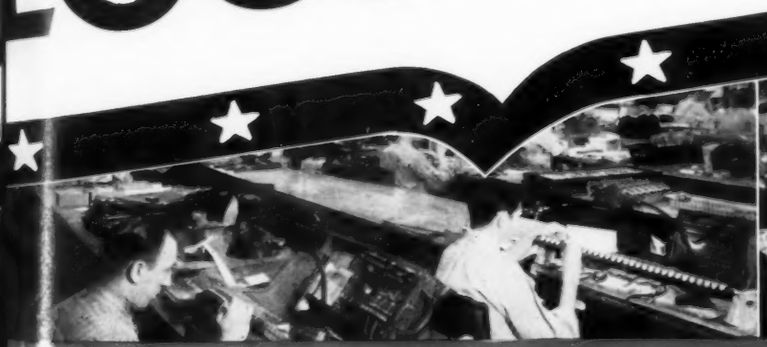
Rolling!

THESE are busy times. All the resources, energies and skills of our great nation are engaged in a mighty effort to build our National Defense. ☆☆☆ The importance of telephone communication to this defense effort is obvious. Kellogg has been called upon to do its part, and we are now manufacturing thousands of units of many types of communication equipment for use by the Signal Corps, the Army, the Navy, the Air Corps, etc. Our plant and personnel have been expanded considerably in order that we may do our share. ☆☆☆ An important link in this chain of cooperation for our national security is the Independent Telephone Industry. That the thousands of Independent telephone companies, located in every State in the Union, should continue to render unfailing good service is essential. Not only do they furnish service to army camps, air fields, gunneries, etc., but their services are equally necessary in civilian pursuits and in industry as well. ☆☆☆ We, here at Kellogg, recognize the fact that the Independent companies are performing a most necessary and vital function. And we are doing our very best to see that these telephone companies are getting the equipment which they need to carry on their good work. We shall continue to do so.

Loyal Kellogg employees are supporting the defense effort by their service and by individual purchases of Defense Bonds thru the company Defense Savings Bond plan.

KELLOGG SWITCHBOARD & SUPPLY COMPANY
6650 S. CICERO AVENUE, CHICAGO



ROOM 2553-A
HOTEL STEVENS
During The Convention
OCTOBER 14-15-16-17
SEE YOU THERE!
NATIONAL CARBON COMPANY, INC.
Unit of Union Carbide and Carbon Corporation
UCC

THE *Important Stop* AT THE CHICAGO CONVENTION

ROOMS 2503-A TO 2509-A
HOTEL STEVENS

●

See STROMBERG-CARLSON'S LATEST CONTRIBUTION TO THE FIELD OF TELEPHONY

The New HANDSET TELEPHONE

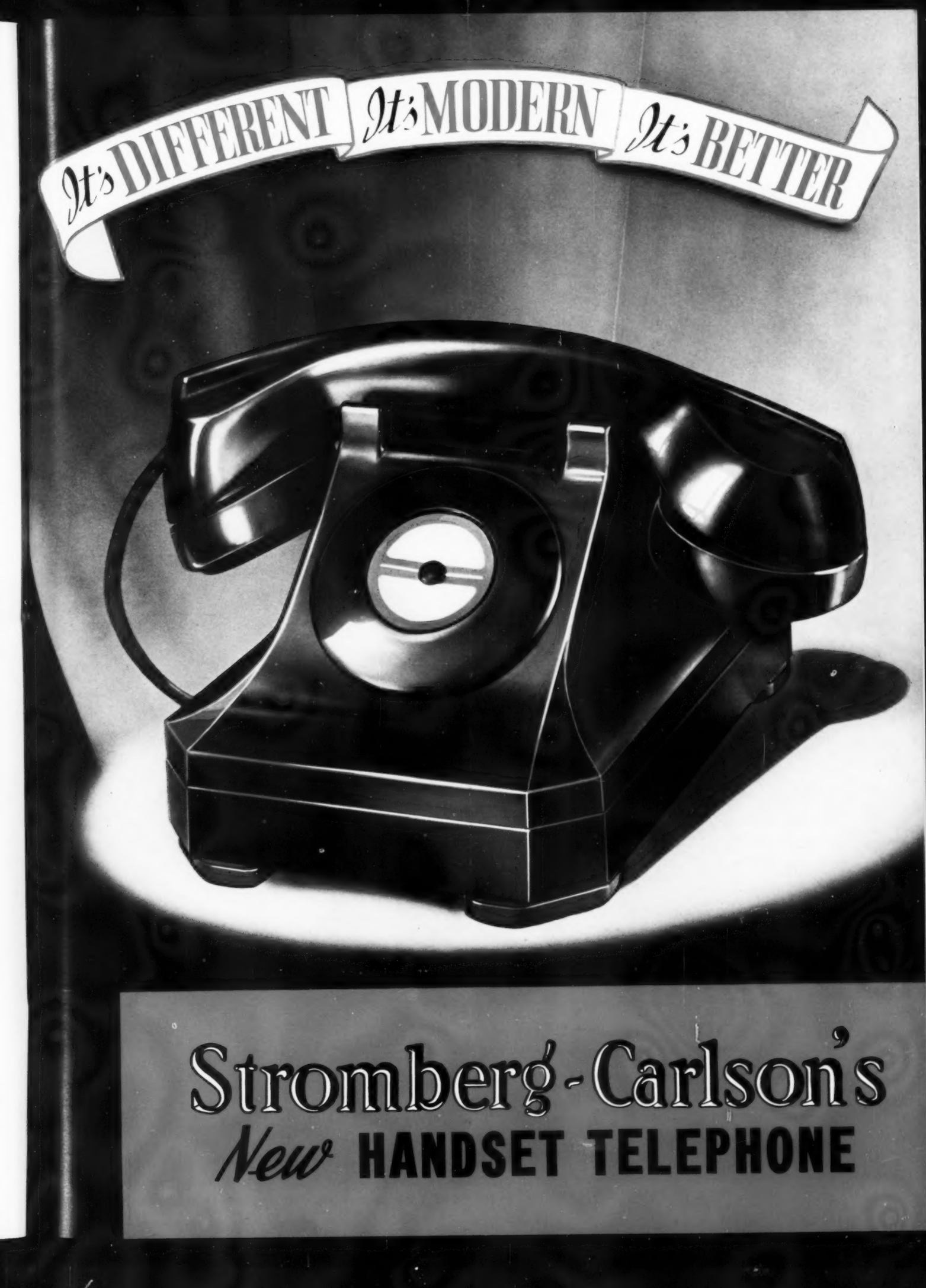
In addition, you can inspect the entire Stromberg-Carlson line, including other types of telephones, switchboards, switchboard parts, wire, cords, construction materials, and supplies.

Stromberg-Carlson

MAKERS OF VOICE TRANSMISSION AND VOICE RECEPTION APPARATUS FOR FORTY-SIX YEARS

STROMBERG-CARLSON TELEPHONE MANUFACTURING CO.
Factory and General Offices: 100 Carlson Road, Rochester, N. Y., U. S. A.
Branch Offices: Chicago, Kansas City, San Francisco, Toronto

Entered as Second Class Matter at the Post Office at Pontiac, Ill., under the Act of March 3, 1879.


It's DIFFERENT It's MODERN It's BETTER
Stromberg-Carlson's
New HANDSET TELEPHONE

The New STROMBERG-CARLSON HANDSET TELEPHONE IS A NOTEWORTHY *Achievement*

FOR USE WITH OR WITHOUT DIAL

THESE FEATURES MAKE THE NEW STROMBERG-CARLSON HANDSET TELEPHONE *Outstanding*

HOUSING— is a single zinc die-casting which includes the cradle. Finished with a synthetic urea-formaldehyde baked enamel.

BASE— is of pressed metal and mounts all equipment except the plunger switch and the dial.

HANDSET— uses flat transmitter and receiver cap to retain capsule-type units. Mouthpiece is non-directional.

TRANSMITTER— is high in fidelity and unusually good on long or short lines, reproducing the voice naturally at any position in which it is held.

RECEIVER— provides a smoother, less resonant response frequency characteristic than any previous Stromberg-Carlson receiver.

RINGERS— are equipped with two-tone gongs producing a clear, penetrating signal free from harshness.

CAPACITOR— composed of two separate units — a 2.25 mf. capacitor for the talking circuit and a 1.00 mf. capacitor for the ringing circuit.

WIRING— All telephones are fully wired for both manual and dial service.

Stromberg-Carlson

MAKERS OF VOICE TRANSMISSION AND VOICE RECEPTION APPARATUS FOR FORTY-SIX YEARS

THESE MECHANICAL AND ELECTRICAL ADVANTAGES MEAN LONG EFFICIENT SERVICE

A temporary terminal strip is provided so that it is an easy matter to change the telephone from manual to dial operation when the need arises.

Neatly laced cable, made of lacquered wires which retain their color brilliancy, permits easy inspection of color code and connections.

Chromium-plated plunger rods at either end of the cradle operate the spring pusher, regardless of how the handset is placed on the cradle.

A stay of black webbing serves as a hinge to prevent strains on the cable wires when the base is removed from the housing.

Separate line and handset terminal blocks permit easy connection of cords. The line terminal block is arranged to connect either a 2 or 3 conductor cord.

Terminals for installing Vincent Rare Gas Relay.

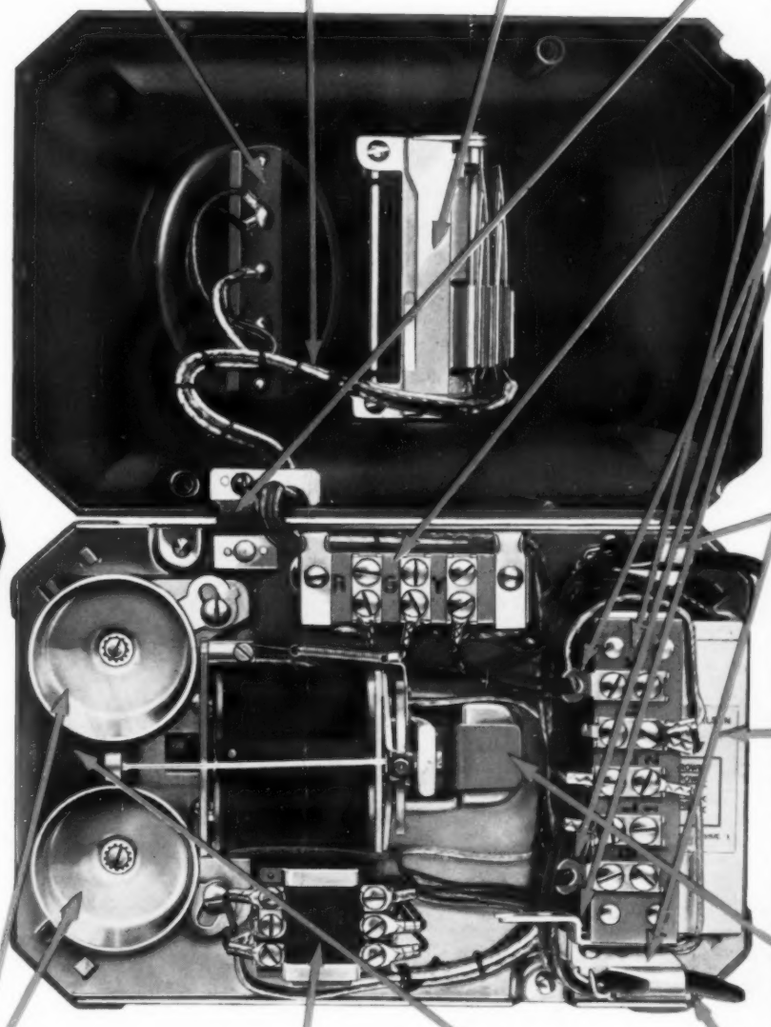
Bracket for mounting W. E. - 333-A Vacuum tube.

These items used for special ringing conditions.

Metal clamps which provide stay cord fastenings, hold and align the handset and line cords with the housing apertures.

Compact double wound condenser with wire and spade clip terminals, provide separate capacitance for the ringer and talking circuits of the telephone

Ringer suspended on rubber quiets clatter normally radiated when ringer is solidly mounted to metal. Method of mounting ringer allows ready interchange of types.



Ringer gongs made from metal of different thicknesses produce a pleasant two-toned signal free from harshness, but of ample volume.

Compact, properly proportioned induction coil used with other elements secures maximum talking efficiency in circuit with minimum side tone.

Louvres in the base allow sound dispersion from the ringer. Rayon fabric protection over the openings excludes insects or the admission of dust.

Rubber feet prevent mars to furniture, protect the telephone from shock, and keep the instrument from slipping when the dial is used.

Stromberg-Carlson

MAKERS OF VOICE TRANSMISSION AND VOICE RECEPTION APPARATUS FOR FORTY-SIX YEARS

THE NEW STROMBERG-CARLSON HANDSET TELEPHONES ARE AVAILABLE IN THE FOLLOWING CODES:

	2 CONDUCTOR TYPE CODE NO.	3 CONDUCTOR TYPE CODE NO.	DESCRIPTION OF RINGER	CODE NO OF RINGER
HARMONIC SERIES	1222-B	1223-B	straight line biased	56-A
	1222-EY	1223-EY	16⅔ cycle	60-E
	1222-FY	1223-FY	33⅓ cycle	60-F
	1222-GY	1223-GY	50 cycle	60-G
	1222-HY	1223-HY	66⅔ cycle	60-H
	1222-NY	1223-NY	25 cycle	60-N
OTHER FREQUENCIES CAN BE FURNISHED AS FOLLOWS	1222-KX	1223-KX	30 cycle	60-K
	1222-LX	1223-LX	42 cycle	60-L
	1222-MX	1223-MX	54 cycle	60-M
	1222-PX	1223-PX	66 cycle	60-P
	1222-RX	1223-RX	16 cycle	60-R

EXTENSION AND TWO-PIECE TELEPHONES

1222. For extension service—less ringer

1224-A. Used with desk set box—less ringer, induction coil and condenser.

AS FINE IN OPERATION AS THEY ARE IN APPEARANCE

In appearance, the new Stromberg-Carlson Handset Telephones are strictly in keeping with the demands of modern subscribers, but of even greater importance is their construction which permits many features that not only please subscribers but are of vital interest to the operating company.

1. Materials selected because of structural strength and ability to take long-lasting finish.
2. Moving parts which require alignment are assembled as a complete unit to a solid frame.
3. Plunger switch contact springs are reinforced with stiffeners so they can be adjusted permanently to definite tension.
4. Ringer armature permanently adjusted to respond to its rated frequency before installation on the base.
5. Minor adjustment of gongs may be made to give the subscriber the signal which pleases him best.
6. Convenient finger grip under the cradle makes it an easy telephone to handle.
7. Correct proportioning of induction coil windings and capacity of condenser sections result in gains in both reception and transmission.
8. Improvement in circuit design results in overall reduction in side tone levels.

TEST SAMPLES ARE NOW AVAILABLE

STROMBERG-CARLSON TELEPHONE MFG. COMPANY
Factory and General Offices:
100 Carlson Road, Rochester, N. Y., U. S. A.
Branch Offices:
Chicago, Kansas City, San Francisco, Toronto

Circular No. 1051 Printed in U. S. A.

Stromberg-Carlson

MAKERS OF VOICE TRANSMISSION AND VOICE RECEPTION APPARATUS FOR FORTY-SIX YEAR

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UNITED STATES INDEPENDENT TELEPHONE ASSOCIATION

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One of the most important meetings the Association has ever held - - - -

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TELEPHONE ENGINEER

MANAGEMENT · ENGINEERING · MAINTENANCE

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Crapo HIGH-TENSILE LINE WIRE

LONG-SPAN, low-cost rural lines — made possible by CRAPO High-tensile, Low-resistance Line Wires — enable you to meet increased service demands economically and profitably.

CRAPO HTL-85, with more than 60% greater tensile strength than standard B.B. wire, permits spans of 225 feet in heavy loading, 375 feet in light loading districts; provides stronger, safer spans on existing lines.

CRAPO HTL-135, with two and one-half times the strength of B.B. wire, makes possible spans of 350 feet in heavy loading, 500 feet in light loading areas.

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Branch Offices: **Chicago, Kansas City, San Francisco, Toronto**

PAGE & HILL
CEDAR POLES for LOW PER-ANNUM COSTS

THE experience of our customers demonstrates that "P&H" Cedar Poles fully measure up to the responsibility placed upon them in line service under varied soil and climatic conditions. They have become the standard of telephone companies who appreciate the real economy of better poles. As distributors, we can conscientiously recommend them.

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ACROSS THE Editor's Desk

To bring you the Convention Number before the Convention has been both work and fun for our entire staff. The manufacturers and suppliers serving our industry made it possible for us to publish an issue that is a real credit to the telephone industry—and one that is the largest Convenion Number we have ever published. We wanted to give you readers full information about Convention plans whether you attend the convention or not and hope you decide to come to Chicago even if you had not planned to be here.

▲

Personally we are looking forward to hearing Carroll Binder and Stanley W. Foran speak during the Convention. We have heard of them but it fell to Brother Roy to have the pleasure of hearing Mr. Foran at the Texas Association convention last March where Oscar Burton and George Butler presented him as a surprise to their convention. We will not miss this time.

▲

In an Editorial on page 18 we invite all convention visitors to drop by our room on the exhibit floor and "chew the fat" with us. It now looks as if our entire staff will be on hand as each of them has told us of certain things they had to do on the Convention floor during the 4-day meeting. So instead of saying the editorial "we" we change our invitation to read: our STAFF invites you for the "bull" session.

▲

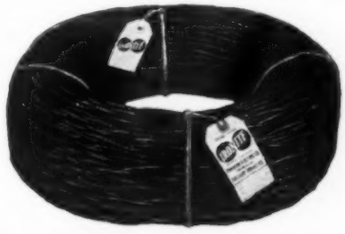
We will be looking for YOU on the morning of October 14 in Chicago.

Ray

YOU CAN GET Genuine *Ironite*

Wherever you are located, you can get Genuine IRONITE — in the shortest possible time — from any of these telephone supply houses. They carry all sizes in stock in warehouses for rush orders. So you don't have to worry about your supply of this better — more economical drop wire.

Remember, too, that the prices they quote you on Genuine IRONITE are from 20% to 30% below the cost of bronze or copper drop wire — and IRONITE, you know, gives equal service in most locations.



When You Get Ironite You Get A Better Drop Wire–Because

Ironite is strong—170# tensile, yet flexible. Carries sleet loads safely.

Ironite has superior insulation — 30% specification rubber, color coded for tracing. Withstands heat and cold to an unusual degree.

Ironite offers a better braid — woven of long-fiber cotton, stearine pitch saturated and armored against salt and sand winds with ground mica forced in under high pressure.

Ironite Conductors are special formula pure iron, double Crapo galvanized.

You can pay more but you cannot get better drop wire at any price.

These jobbers and supply houses carry Ironite in stock for quick delivery

AMERICAN AUTOMATIC ELECTRIC SALES CO.
1033 W. Van Buren St., CHICAGO
Warehouses: Dallas, Kansas City, Los Angeles, San Francisco, Richmond, Va.

KELLOGG SWITCHBOARD AND SUPPLY CO.
6650 S. Cicero Ave., CHICAGO
Warehouses: Kansas City, San Francisco.

LEICH SALES CORPORATION
427 W. Randolph St., CHICAGO

STROMBERG-CARLSON TELEPHONE MFG. CO.
100 Carlson Rd., ROCHESTER, N. Y.
Warehouses: Chicago, Kansas City, San Francisco, Toronto, Ont.

SUTTLE EQUIPMENT COMPANY
Lawrenceville, Ill.

And all other telephone Supply Houses or direct from

Paragon Electric Company 39 W. Van Buren St. CHICAGO

Teletalk Systems will reduce the unprofitable use of your equipment

• The increasing use of Teletalk proves conclusively that Teletalk does relieve switchboard congestion by eliminating inter-office calls that are profitless to the telephone companies.

In practically every report we receive from users, the following statement is emphasized to a greater or lesser degree: "Teletalk eliminates switchboard congestion and leaves our telephone service open for important incoming and outgoing calls."

Teletalk will add materially to your revenue and provide better service for your subscribers.

Teletalk is an amplified intercommunicating system which operates off the light circuit and is independent of the telephone service in offices, factories and institutions of all kinds. Its tone quality is unexcelled. Its appearance is attractive. It is extremely flexible. It accommodates from 5 to 24 stations. Various models possess special features which offer special advantages. The units are not expensive. Installation is easy and low in cost. It is now being used by leaders in every type of business.

Technical information regarding various models and their application and installation will be found in Sweet's Architectural Catalog, or by writing for full details, or confer with any Graybar Electric house.

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WEBSTER ELECTRIC COMPANY, Racine, Wisconsin, U.S.A. Established 1909. Export Department: 100 Varick St., N. Y. C. Cable Address: "ARLAB" New York City

WEBSTER ELECTRIC

"Where Quality is a Responsibility and Fair Dealing an Obligation"

MANUFACTURERS OF TELETALK INTERCOMMUNICATION AND PAGING SYSTEMS • POWER AMPLIFIERS AND SOUND DISTRIBUTION EQUIPMENT • RADIO PHONOGRAPH PICKUPS • IGNITION TRANSFORMERS AND FUEL UNITS FOR OIL BURNERS

Crapo HIGH-TENSILE LOW-RESISTANCE LINE WIRE

Wherever Telephone Men Meet, You'll Hear This Story Repeated Again and Again!

"We're now building better lines than ever before at real savings in costs!"
— PLANT ENGINEER

"WE'VE gone over 100 per cent to *Crapo* High-Tensile Line Wire," says this telephone engineer. "We're building new long-span lines with *Crapo* HTL-135 and we're using *Crapo* HTL-85 for all replacement on present pole structures."

"Our costs per mile on new construction are 'way below former costs and we have better lines than ever before. Maintenance expense also has been substantially reduced wherever these new high-tensile line wires are in use."

That's the story you hear from all who have adopted *Crapo* High-Tensile, Low-Resistance Line Wire: lower construction and maintenance costs, better and more dependable service, greater customer satisfaction.

Your Supply Jobber's salesman will give you complete information about these revolutionary wires for overhead lines. Or, write direct for Bulletins No. 201 and No. 202.

For Long Spans

For Extra Long Spans

INDIANA STEEL & WIRE COMPANY · MUNCIE, INDIANA

EDITORIAL

Our Convention Number

HERE is your TELEPHONE ENGINEER Convention Number. In it you will find all the details of the coming 45th Annual Convention of the United States Independent Telephone Association to be held in Chicago, October 14, 15, 16 and 17.

Naturally we are quite proud of our efforts in bringing you this enlarged issue as it marks another milestone in our efforts to bring you a real trade publication of the type we feel the industry needs. It is, incidentally, the largest Convention Number we have ever published. The increase in regular advertising and subscribers among telephone men means to us that we must be publishing a better magazine and doing a better job than in the past. We sincerely hope so.

THERE are several features presented in this issue that we particularly call to your attention.

1. We urge each reader to read and check all details regarding the Convention. It is momentous in our lives when decisions on Taxes, Continuing Property Records, Defense problems and Priorities come up at the same time. The industry needs your help. Attend the Convention and do your share.

2. Our readers might profitably check each advertisement as many manufacturers and suppliers have gone to much time and expense to present messages in this issue that might be termed as "news". Better still, attend the Convention and SEE the exhibits.

3. The entertainment features you will see and enjoy when you come to Chicago on Convention business. Not much time will be available to entertainment but what there is will be fun.

We here at TELEPHONE ENGINEER would consider it an honor to have you drop in to see us during the convention and will have our room on the exhibit floor for your enjoyment. Your opinion as to our efforts to serve you better will be solicited so be it a handshake or constructive criticism we will be looking for you in Room 2513-A at the Stevens Hotel.

LOW COST *OVERALL* POLE PROTECTION

is Yours in

P & H FULL-LENGTH TREATED NORTHERN WHITE CEDAR POLES

Mixing tank for preservative solution

For forty years, the outstanding quality of P & H Northern White Cedar Poles has established them as the standard of the telephone industry.

Now this LOW COST overall protection is keeping P & H Poles "Still in the Lead."

The poles are completely submerged in a ***highly chlorinated phenol*** solution many times more toxic than other known preservatives. Laboratory control of entire operation assures a predetermined amount of phenol in the sapwood. The result is a clean, dry, odorless pole with natural color retained.

Interesting details sent on request.

Large vat used for complete submersion of poles in preservative solution.

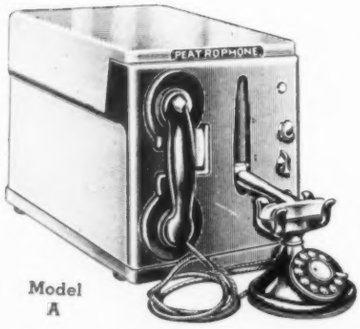
"Still in the Lead"

PAGE AND HILL CO.

MINNEAPOLIS, MINNESOTA • 50 CHURCH STREET, NEW YORK, N. Y.

DISTRIBUTED BY AMERICAN AUTOMATIC ELECTRIC SALES COMPANY • STROMBERG-CARLSON TELEPHONE MANUFACTURING COMPANY

No—Mr. Smith is out of the city and will not be back until Thursday. Would you care to leave a message?



Model A

They BOTH do the same job *but* - -

PEATROPHONE, the Mechanical Secretary, offers the following distinct advantages –

- A savings of from 80 to 90% over the salary cost of the usual office girl.
- TWENTY-FOUR HOUR SERVICE, 365 days per year.
- With the elimination of the human element, messages are delivered 100% correct. For the same reason messages delivered to patrons are always courteously and correctly delivered.
- Enables user to keep a permanent record of all calls.

A NEW Source of INCOME for TELEPHONE EXCHANGES

★

LEASE *Peatrophone*

to your Subscribers and Make Money

Model B

"Peatrophone, the Mechanical Secretary, is the sensation of the 1940 Annual Convention of the United States Independent Telephone Association."

Chicago Tribune

The NEW and IMPROVED *Peatrophone* will be the "HIT" of the 1941 Convention

★

YOU Are Cordially invited to see it Demonstrated in Room 2561-A at the Convention

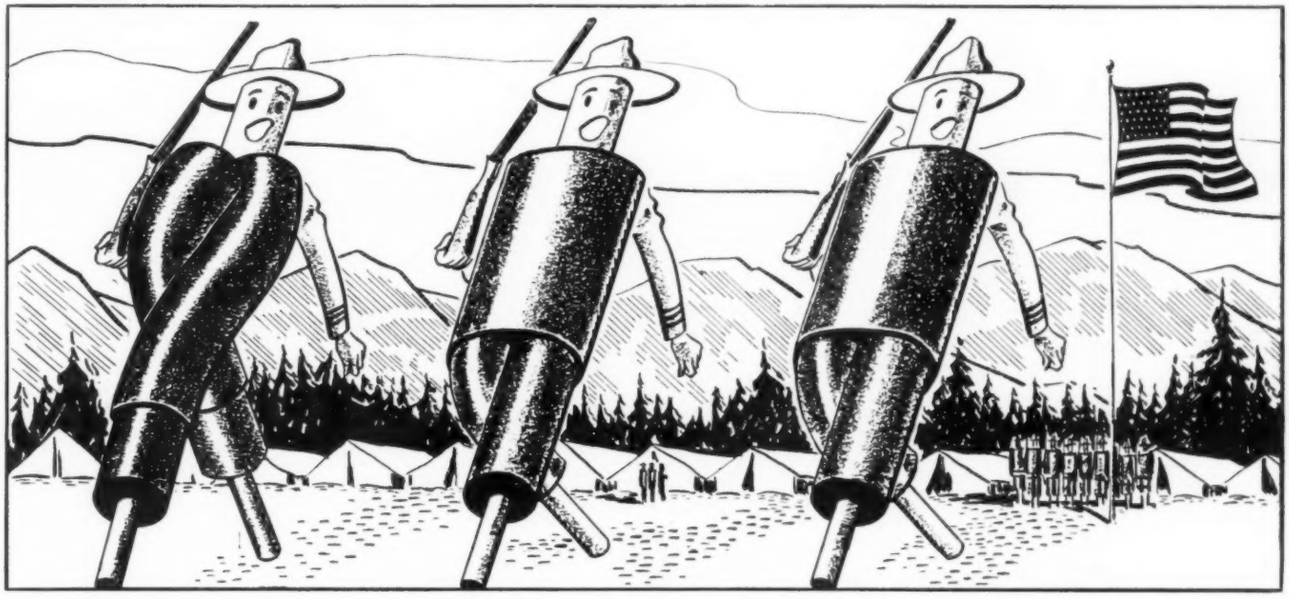
PEATROPHONE CORPORATION

342 MADISON AVENUE NEW YORK, NEW YORK

HOME OFFICE—Sumter, S. C.

Home of the Famous "Sumter" Telephone

WE'RE IN THE ARMY NOW!



ACORN Telephone Field Wire

MEETS GOVERNMENT REGULATIONS FOR DEFENSE

Acorn's Army "drop-twist" can and must TAKE-IT.

It stands long storage —

— has a strong braid —

— is wonderfully weather-proofed.

As goes ACORN to our Army — So goes it to our Independents.

★

We will be at the USITA Convention October 14-17 at the Stevens Hotel—Room 2514

Despite the heavy demands for materials caused by the defense program and, in many instances scarcity of materials, ACORN will NOT sacrifice quality in any of its shipments to telephone companies.

THIS IS A PLEDGE!

ACORN INSULATED WIRE CO., INC.

225 King Street — **Cumberland 6-7200** — **Brooklyn, N. Y.**

Chicago Stock — ***Cleveland Stock***

LEICH SALES CORPORATION
427 W. Randolph - Franklin 2931 - Chicago

LINDSAY SUPPLY COMPANY
4815 Superior Ave. - Endicott 0110 - Cleveland

Priorities

ALL TELEPHONE COMPANIES HAVE A PRIORITY CALL ON US TO SELL THEIR TELEPHONE DIRECTORY ADVERTISING

See Us at the Chicago Convention Next Week

L. M. BERRY & CO.

Thirty-one Years of Selling Telephone Directory Advertising Exclusively

L. D. 16 **ADams 4127**

TELEPHONE BLDG., DAYTON, OHIO

Rooms 2555-A and 2556-A
STEVENS HOTEL During the Convention

CLEARS TROUBLE IN A HURRY

Averages $6.00 Saving per Fault

This easy-to-use Wheatstone Bridge puts its finger on faults—locates grounds, crosses or opens—enables trouble-shooters to clear lines or cables in minimum time.

A recent survey among users indicates that this Test Set saves from 1 to 8 hours in locating faults, as compared with other methods. In terms of man-hour cost of trouble-shooting, it saves an average of $6.00 per fault. From this average figure, it appears that after locating 21 faults the instrument has saved enough to pay for itself. After its 21st location, this test set is actually earning money.

These savings, as well as the benefits of subscriber good-will are yours with the purchase of one of these Test Sets. Price is $125.00. If more information is required, write for Catalog E-53-441(1).

A Free Handbook explaining methods of using this Bridge for locating grounds, crosses, opens and other faults, will be sent on request. Write for Note Book E-53-441 "Notes on Fault Location in Cables."

5430-A
Type U
Test Set

LEEDS & NORTHRUP COMPANY, 100 E. LOGAN ST., PHILA., PA.

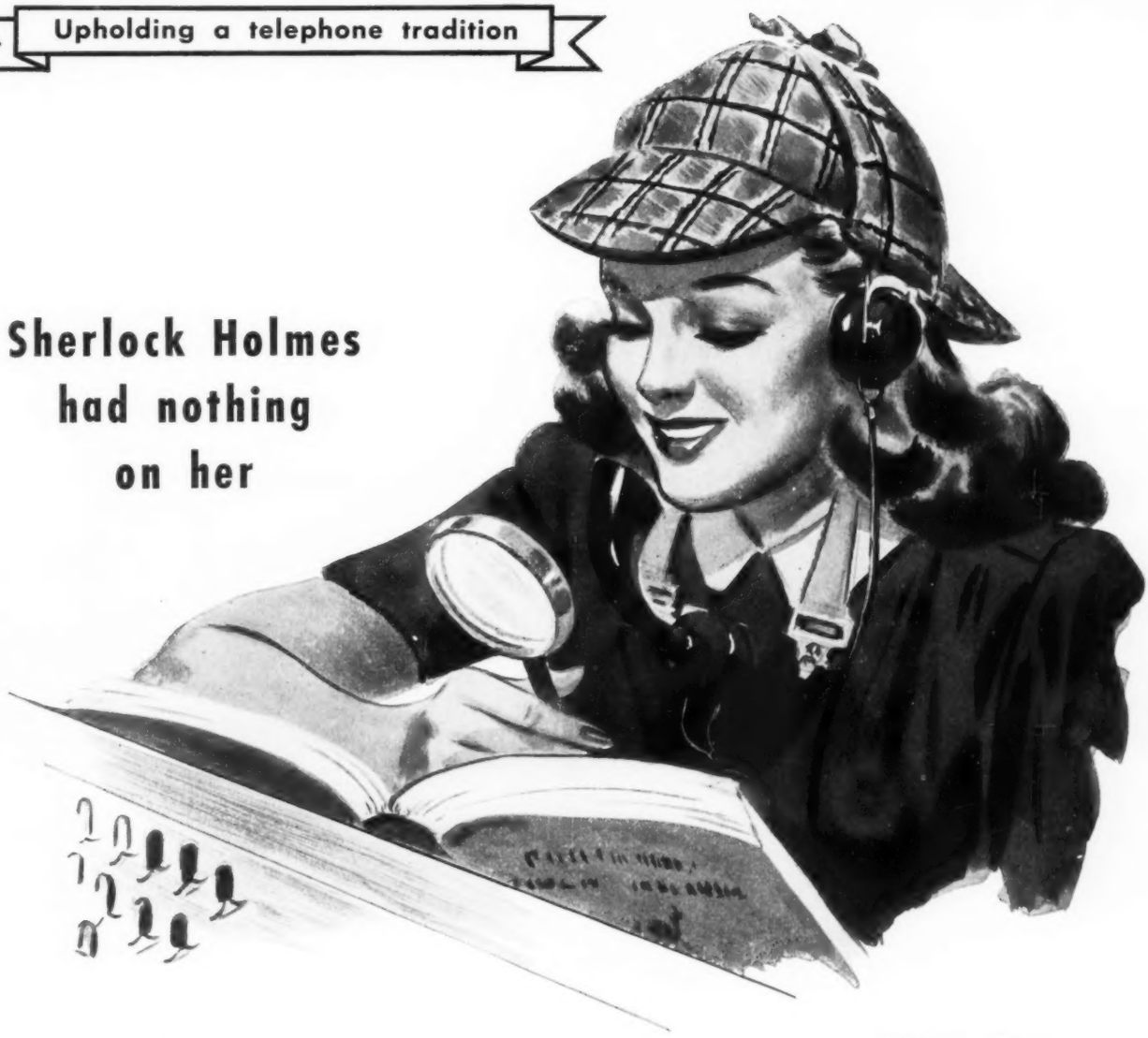
LEEDS & NORTHRUP

MEASURING INSTRUMENTS · TELEMETERS · AUTOMATIC CONTROLS · HEAT-TREATING FURNACES

Jrl Ad E-53-441 (4)

Upholding a telephone tradition

Sherlock Holmes had nothing on her



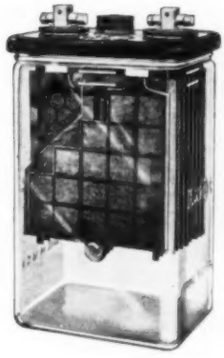
AN emergency call came into the long distance switchboard of a large Eastern city . . . and the Evening Chief Operator did a neat bit of detective work in record time.

Excitedly, a subscriber told her: "My brother has just been flown East from Arizona to a Washington hospital, but I don't know its name. His wife, my sister-in-law, has arrived by train and is staying with a relative, whose last name is all I can tell you. Please put through a call to my sister-in-law in Washington, D. C., as soon as possible!"

With this meager information, the alert Chief Operator achieved a minor miracle. In a remarkably short time, the subscriber's sister-in-law was found, and was talking!

Alertness and dependability in an emergency are typical of telephone service. The people who uphold this splendid telephone tradition are *dependable* under any conditions . . . and so is telephone equipment such as Exide Batteries, which have shared in telephone progress for 46 years.

No matter what the service . . . common battery, emergency reserve, signal or P.B.X., in small or large exchanges . . . you'll find that dependable Exides live up to the best in telephone tradition.



Exide

TELEPHONE BATTERIES

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia

The World's Largest Manufacturers of Storage Batteries for Every Purpose

Exide Batteries of Canada, Limited, Toronto

VISIT

LORAIN PRODUCTS

ROOM 2515-A NATIONAL TELEPHONE CONVENTION

SUB-CYCLE is as modern in design and performance as the 1942 motor cars now on display. Guaranteed to give consistently good performance . . . dependable ringing service under all operating conditions. See it at our exhibit . . . note the exclusive features; No moving parts, nothing to adjust, economical and quiet operation. We'll be expecting you.

★ LORAIN PRODUCTS CORPORATION

LORAIN — OHIO

Sold by Leading Distributors

LENZ LENZ LENZ LENZ LENZ LENZ LENZ LENZ LENZ LENZ LENZ LENZ LENZ LENZ LENZ LENZ LENZ

LENZ ROOM NO. 2517

Once again, we welcome you to drop in for a cheery hello, a pleasant chat or a prolonged rest period.

Make Room No. 2517 Your Convention Headquarters

LENZ

CORDS SWITCHBOARD, OPERATORS, RECEIVER, DESKSTAND, HAND SET, TRANSMITTER.

CABLE SWITCHBOARD AND INTER-PHONE, SILK AND COTTON INSULATED, BRAIDED AND LEADED.

WIRE FLAMEPROOF JUMPER, SWITCHBOARD, BANK, INTERIOR TELEPHONE.

LENZ

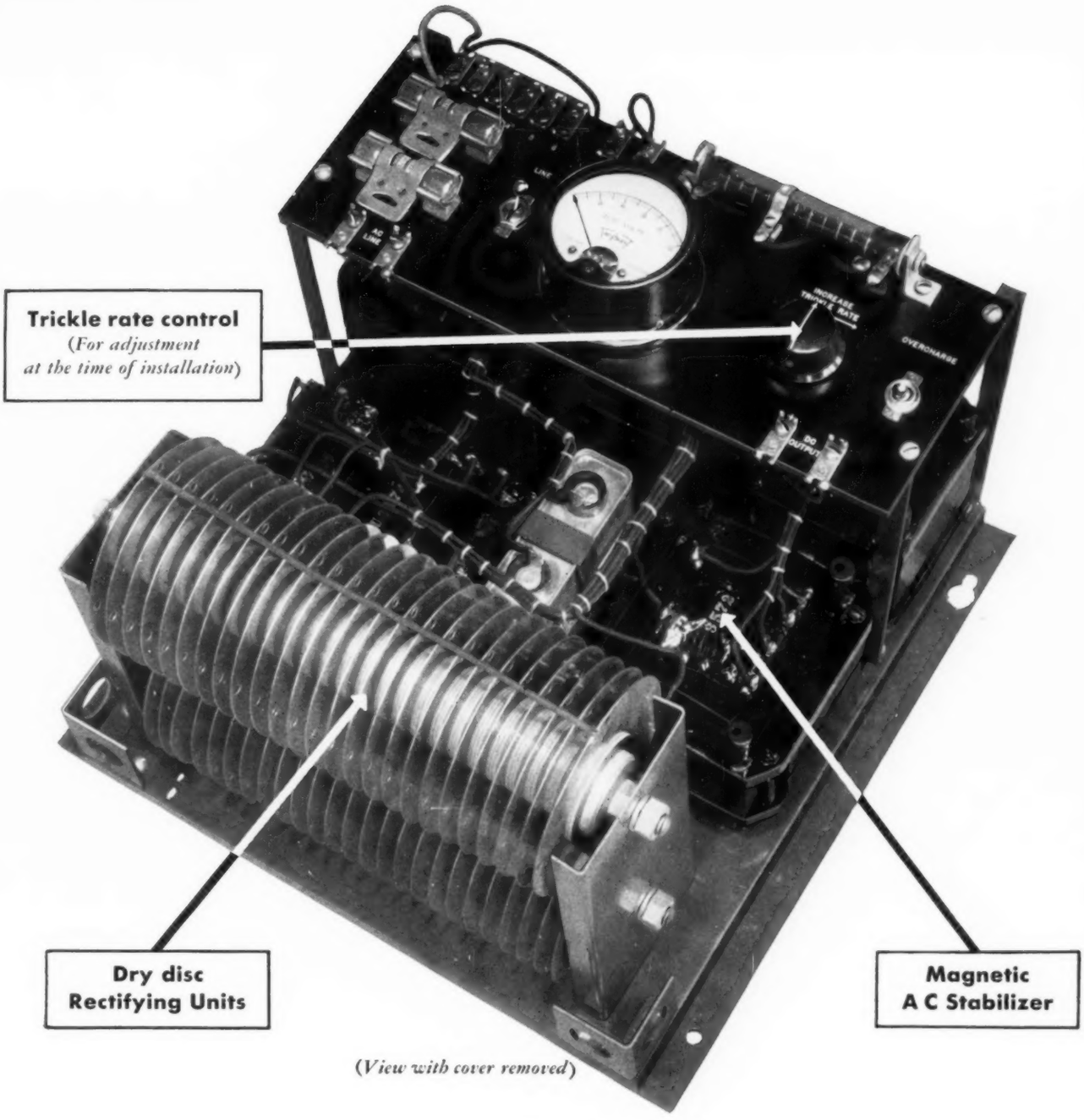
LENZ ELECTRIC MANUFACTURING CO.

DISTRIBUTOR
Leich Sales Corporation
427 W. Randolph St., Chicago

1751 NORTH WESTERN AVENUE, CHICAGO

IN BUSINESS SINCE 1904

DISTRIBUTOR
H. H. VAN LUVEN
307 E. 3rd St., Los Angeles



(*View with cover removed*)

RAYTHEON RECTICHARGERS OPERATE UNATTENDED

PLUG 'em in — go away and forget 'em. What a pleasure it is to use a battery charger without moving or expendable parts. Nothing that requires frequent adjustment.

The ingenious design of the Raytheon RectiChargeR enables its output to follow the load and assume full responsibility for keeping your storage batteries fully charged, neither burning them up by overcharging nor starving them by undercharging.

Battery life may be increased as much as 40%.

SEE OUR DISPLAY AT THE U.S.I.T.A. CONVENTION, STEVENS HOTEL, OCT. 14-17.

Operating difficulties such as under and over voltage, short lamp life, frying transmitters and sticking relays are automatically eliminated.

RAYTHEON MANUFACTURING COMPANY
190 WILLOW STREET, WALTHAM, MASS.

Please send your illustrated literature on Raytheon RectiChargeRs.

Name.....

Address.....

.....

10TE

The Curtain Rises!

On 1941's Most Outstanding Line Construction Development

The *New* Dillon

Combination Shunt - Traction

DYNAMOMETER

• • •

Be sure to see this valuable new Instrument on display in Room 2535-A, at the Convention

Does the work of both shunt *and traction dynamometer.* Simple, *easy* to use. Checks correct tension in *established* lines when used as a *shunt* dynamometer or tensiometer, and also shows correct tension in *new* lines going up when used as a *traction* dynamometer or tensiometer. Nothing ever before like it!

• • •

Also on display at Dillon headquarters are the well known Dillon Temperometer—Anchors—Bisectors—etc.

Be sure to see them all

W. C. Dillon & Co., Inc.

5410 W. HARRISON STREET CHICAGO, ILLINOIS

ACTUAL INSTALLATIONS of GRAY Telephone Pay Stations that are paying *handsome returns!*

Photo courtesy of Associated Telephone Company Limited

At the National Convention we will show you additional photographs of actual installations and statistics that will convince you of the tremendous volume of business being done through Telephone Pay Stations today.

Today's increased business activities are placing greater demands on all types of communication systems all over the country.

MAKE THE MOST OF THIS OPPORTUNITY by placing Gray Telephone Pay Stations in convenient localities. . . . . but DO IT NOW!

We cordially invite you to visit us in ROOM 2516-A at the National Convention to view our new models and to discuss your Pay Station problems.

The GRAY MANUFACTURING COMPANY

the **GRAY MFG. CO.**

AUTHORIZED AGENTS:
American Automatic Electric Sales Co. Graybar Electric Co. Kellogg Switchboard and Supply Co. Leich Sales Corp. The North Electric Mfg. Co. Stromberg-Carlson Telephone Mfg. Co.

IN CANADA:
Canadian Telephones & Supplies, Limited. Northern Electric Co., Limited.

HEAD FOR The BIG ROUND-UP

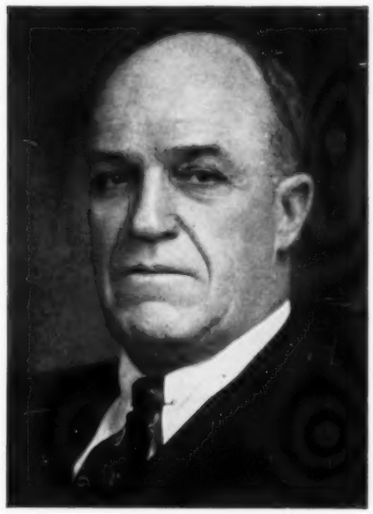
• *Plug-in* for a *line* on your old friends in our room at the United States Independent Telephone Association Convention. Many *chaps* of the industry will *hook-up* for an *exchange* of greetings, and perhaps a *priority* claim or two. Your *frequencies* are *unrestricted* and *inspection* of *reliable* equipment is optional. You are invited to establish your *central office* in

• • • ROOM 2512A Stevens Hotel

Reliable ELECTRIC COMPANY
OVER 30 YEARS SERVICE TO THE UTILITIES
3145 CARROLL AVENUE • CHICAGO ILLINOIS

Louis Pitcher, Executive Vice-President.

Carl D. Brorein, President.



Chas. E. Deering, Sec.-Treas.

USITA EXPECTS LARGEST CONVENTION IN HISTORY

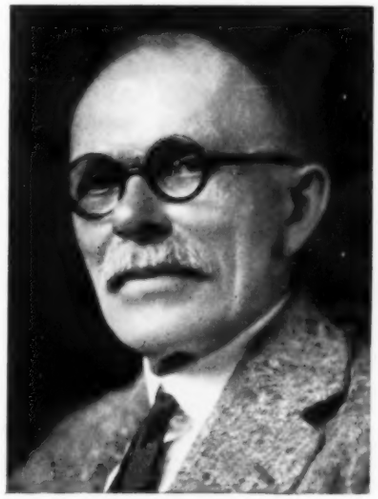
By RAY W. SMITH, Editor

THE program of the 45th Annual Convention of the United States Independent Telephone Association to be held at the Stevens Hotel, Chicago, October 14, 15, 16 and 17, has been completed and is carried in this the Convention Number of TELEPHONE ENGINEER. It is now predicted that the registration for the 4-day meeting will be the largest in all history as the Stevens Hotel reports 25% more registrations at this writing than in past years.

Lieutenant Colonel W. C. Henry, Vice-President.

There will be a variety of important subjects to come before the Convention. Chief among these will be discussion of methods to be used in billing on taxes imposed by the Revenue Act of 1941, the Priority plan of purchasing materials, Defense and Continuing Property Records. The Conferences on Accounting, Commercial, Plant and Traffic have full schedules as you will notice from the various letters received from Chairmen of the Committees carried in another part of this issue.

Association officials have arranged to have two prominent speakers of nation wide repute to address the assembled convention on the afternoon of Thursday, October 16. You will hear Carroll Binder, Foreign Editor of the Chicago Daily News, depict in a very interesting way the world today plus his experiences in the past that included work in many foreign lands as a foreign correspondent for his great paper. The affairs of the world are brought to you fresh and first hand when he speaks as his daily duties include the editing of all foreign news coming in over all private wires of the Daily News besides



John H. Wright, Vice-President.

Official Program

UNITED STATES INDEPENDENT TELEPHONE ASSOCIATION

FORTY-FIFTH ANNUAL CONVENTION PROGRAM

(Chicago Daylight Saving Time)

TUESDAY, OCTOBER 14, 9:00 A. M. REGISTRATION, 25th Floor Lobby

(Men may register for wives—Each registrant is entitled to purchase one banquet ticket at $1.50. Manufacturers and suppliers pay balance of cost of banquet, approximately $5.00 per person).

10:00 A. M. VISITING EXHIBITS

2:00 P. M. GENERAL OPENING SESSION: (Tower Room—29th Floor)
President's Annual Address, Carl D. Brorein—Reports of Officers —Miscellaneous business

6:30 P. M. Conference and Dinner State Association Executives— (Room Two—Third Floor)

WEDNESDAY, OCTOBER 15

9:00 A. M. ANNUAL BUSINESS MEETING INDEPENDENT PIONEER TELEPHONE ASSOCIATION OF THE UNITED STATES (Tower Room—29th Floor)
Address: by Charles Evans of Little Rock, Arkansas

12:00 NOON. COMPLIMENTARY LUNCHEON AND STYLE SHOW TO VISITING LADIES WHO ARE REGISTERED—MARSHALL FIELD'S

2:00 P. M. GENERAL SESSION (Boulevard Room, Second Floor)
WASHINGTON ACTIVITIES—Mr. Clyde S. Bailey, Washington Representative U.S.I.T.A.
ARMY CONTACTS—Lt. Col. Wm. C. Henry
Topics—Application New Federal Taxes, Priorities, Telephone service and the U. S. Army
Election of Directors
Reports of Committees on Toll Compensation—Wage Hour
VISITING EXHIBITS

THURSDAY, OCTOBER 16, 9:00 A. M. DIVISION CONFERENCES

Accounting
Commercial
Plant
Traffic

2:00 P. M. Boulevard Room (Second Floor)
Address: Mr. Carroll Binder, Foreign Editor Chicago Daily News
Address: Mr. Stanley W. Foran, President, Stanley W. Foran Advertising Agency, Dallas, Texas

7:00 P. M. PIONEERS' BANQUET AND DANCE

FRIDAY, OCTOBER 17, 9:30 A. M.

Address: Mr. Francis X. Welch, Washington Associate editor "Public Utilities Fortnightly"
Address: Lt. Col. J. C. Grable
National Problems—C. C. Deering, Secretary-Treasurer
OPEN FORUM
ADJOURNMENT SINE DIE.
SERGEANTS-AT-ARMS—S. A. Lane, Foster McHenry, Richard Cole

STEVENS HOTEL, CHICAGO

REGISTRATION and EXHIBITS – 25th FLOOR

that of the press associations.

The other speaker outside-the-industry is Stanley W. Foran. He heads the Stanley W. Foran Advertising Agency and is known as one of the most dynamic speakers before the public today. He is known as the "Salesman of Americanism" and in a brief career before the public of less than 3½ years has addressed 595 audiences. Also active on the radio he has spoken to an unseen audience over 100 times and has found it necessary to furnish over 35,000 copies of his speech to requests by listeners. These two speakers compare most favorably to the prominent speakers you heard last year at the convention.

Besides the business sessions arrangements have been made for entertainment which include a Complimentary Luncheon and Style Show, to visiting ladies who are registered, at Marshal Field's at noon on October 15. The members of the Ladies Entertainment Committee are: Mrs. E. C. Blomeyer, Chairman; Mrs. Carl D. Brorein, Vice-Chairman; Mrs. G. B. Foscue; Mrs. F. R. McBerty; Mrs. H. T. McCaig; Mrs. A. Parlett, Jr., and Mrs. Louis Pitcher.

Entertainment highlights of the entire meeting will be the Annual Banquet of the Independent Pioneer Telephone Association to be held Thursday evening, Oct. 16. The committee in charge of this banquet has changed the plan formerly followed in the past years as there will be no table reservations made prior to the opening of the registration desk. This gives every one a chance for a good table as reservations will be handled on a "first come-first served" basis. Tickets will be available at the registration desk for only $1.50 per person as the manufacturers and suppliers are making up the difference and are contributing funds to furnish you a $5.00 dinner, entertainment and dance. Each registrant must make his own reservation and no tickets will be handed out by manufacturers.

The official Program will run on Chicago Daylight Saving Time. The first day, October 14, will be devoted to registering and visiting of exhibits during the morning, with opening general session in the afternoon. The Exhibits this year are to be very interesting from the operating man's viewpoint as many of the manufacturers are loaded to the hilt with orders and salesmen of materials in past years will serve more as salesmen of goodwill this year. Several new products will be shown by different manufacturers. We call your special attention to the items listed later on in this story where you will get a better description of each individual exhibit.

Ladies Entertainment Committee

Mrs. E. C. Blomeyer, Chairman
Mrs. Carl D. Brorein, Vice-Chairman
Mrs. G. B. Foscue
Mrs. F. R. McBerty
Mrs. H. T. McCaig
Mrs. A. Parlett, Jr.
Mrs. Louis Pitcher

The general session scheduled for the afternoon of opening day will feature the speech by president Carl D. Brorein who will deliver the keynote of the meeting. Following will be reports by other officers of the association and miscellaneous business.

That evening, Oct. 15, there will be the annual Conference and Dinner for State Association executives. A larger percentage of attendance is expected this year from this group and officials of the National Association are particularly desirous of all of them present at the Conference.

George W. Rodormer, President of the Independent Pioneers Telephone Association.

The program for Wednesday, Oct. 15, will start at 9 a. m. The Independent Pioneer Telephone Association will be in charge of the program. Their business sessions will be held where several important changes are scheduled to be discussed. The Pioneers have

ACCOUNTING CONFERENCE

C. E. ARCHER
Chairman of Accounting Committee

Mr. Ray W. Smith, Editor,
Telephone Engineer
Publishing Corp.,
Chicago, Illinois.

Dear Sir:

I am sure you will be interested to know that the Accounting Committee of our Association will discuss as its principal subject at the Accounting Conference during the Convention the matter of "Continuing Property Records." This subject is of vital importance to the Telephone Industry and accountants in particular.

In addition the matter of handling tax affecting billing, exchange, toll and miscellaneous, will be discussed. This particular phase of accounting at the present time being not only a live issue but one in which accountants will be particularly interested.

It is believed that any one of these two subjects could occupy the alloted time; however it is the purpose of our Committee to deal with both subjects as exhaustively as possible in the time given our conference.

Very truly yours,
C. E. ARCHER,
Chairman, Accounting Committee.

enlarged greatly during the past year under the leadership of president George W. Rodormer. Chapters in California and Nebraska have been installed with officers selected by the chapters to lead their activities. Both chapters have already held meetings and several hundred new members have been enrolled. Following the business session the Pioneer Association will hear Charles Evan, Public Relation Director, Arkansas Power & Light Co., Little Rock, in a feature address. Mr. Evans recently appeared in the program of the Arkansas convention (reported in this issue) and our report is that he is one of the best on the public platform today.

At noon the ladies will have their luncheon and style show. Promptly at 2 p. m. general sessions will begin for a most important subject. Scheduled to be heard will be Association Washington Representative Clyde Bailey. Those who attended the Spring Conference remember the wide awake forceful talk made by Mr. Bailey and will want to hear him at this meeting because of the many events that have transpired in Washington since that time. Topics of this session are on the application of the new federal taxes, Priorities, service and the U. S. Army. All of these subjects are important NOW. Election of Directors will be next on the program. Reports of the Committee on Toll Compensation, E. M. Blakeslee, chairman, and the Wage-Hour Committee, John H. Agee, chairman, will be presented at this session.

Division Conference will be the order of the day Thursday Oct. 16, with each Conference to hold its own meeting. Elsewhere in this issue we carry

List of Exhibitors

ROOM NO.	EXHIBITOR
2503-2510	American Automatic Electric Sales Co. Automatic Electric Co.
2539-2540	American Crossarm & Conduit Co.
2527	American Steel & Wire Co.
2555-A & 2556-A	L. M. Berry & Co.
2536-A	Buckeye Telephone & Supply Co.
2557-A	Burgess Battery Co.
2558-A	A. B. Chance Co.
2552	Channell Splicing Machine Co.
(Booth in Lobby)	Churchill Cabinet Co.
2559	Coffing Hoist Co.
2532-A, 2533-A & 2534-A	Cook Electric Co.
2540-A	Copperweld Steel Co.
2564	Cramer Posture Chair Co.
2535-A	W. C. Dillon & Co.
2552	R. R. Donnelly & Sons Co.
2516	The Electric Storage Battery Co.
2529	The Everstick Anchor Co.
2515	Fansteel Metallurgical Corp.
2503	General Cable Corp.
2537	Gould Storage Battery Corp.
2516-A	Gray Mfg. Co.
2562	W. A. Hammond Drierite Corp.
2563	Harding Universal Tel. Repeaters
2555-A & 2556-A	Gustav-Hirsch Organization
2529-A	Holtzer-Cabot Electric Co.
2539-2540	Hubbard & Co.
2558	Independent Pioneer Tel. Ass'n. J. K. Johnston, Sec'y
2534	James R. Kearney Corp.
2500-1 2501-A, 2502 & 2502-A	Kellogg Switchboard & Supply Co.

ROOM NO.	EXHIBITOR
2558	John C. Larkin & Co.
2511, 2513 & 2514	Leich Sales Corp.
2517	Lenz Electric Mfg. Co.
2509	Line Material Co.
2510	Loomis Advertising Co.
2515-A	Lorain Products Corp.
2560	The MacGillis & Gibbs Co.
2553-A	National Carbon Co., Inc.
2554-A	The National Telephone Supply Co.
2525	Naugle Pole & Tie Corp.
2553	Neale Mfg. Co.
2518-2523	The North Electric Mfg. Co.
253[illegible]	Page & Hill Co.
2560-A & 2561-A	Peatrophone Corp.
2537-A	Philco Radio & Television Corp.
2557	Ray-O-Vac Co.
2559-A	Raytheon Mfg. Co.
2532	Recordak Co.
2510-A & 2512-A	Reliable Electric Co.
2530	John A. Roebling's Sons Co.
2556	Runzel Cord & Wire Co.
2530-A	Schauer Machine Co.
2561	M. C. Sellers
2528	Shallcross Mfg. Co.
2503-A to 2509-A	Stromberg-Carlson Tel. Mfg. Co.
2555	Suttle Equipment Co.
2533	Taylor-Colquitt Co.
2513-A	TELEPHONE ENGINEER Pub. Corp.
2514-A	The Telephone Repair Co.
2539-A	Telephony Publishing Co.
2517-A	Templeton Kenly & Co.
2549-2550	Texas Creosoting Co.
2536	Unique Mfg. Co.
255[illegible]	U. S. Rubber Co.
2527	U. S. Steel Corp.
2557	Wagner Malleable Products Co.

Clyde S. Bailey, Washington representative of U.S.I.T.A.

the programs of each Committee as given us by their Chairman. During the afternoon the speakers mentioned earlier will speak in the Boulevard Room on the 2nd floor of the Stevens. Both Mr. Binder and Mr. Eoran will address you at that time.

At the banquet on the evening of October 16 you will be entertained by a famous band who will play during your dinner hour, the entertainment and later for the dance. The Committee in charge reports that plans are completed to open the banquet room promptly at the appointed hour. It is hoped the entertainment can be presented with little or no change of locations of the diners.

The last day will be featured by addresses by two well known men of the industry with an important message to every operating company. Francis X. Welch, associate editor of Public Utilities Fortnightly will speak on Priorities. This subject will be more and more of importance to operating companies and Mr. Welch will bring you the very latest word on developments from Washington where the matter is in the hands of the OPM.

Lieut. Col. J. C. Grable, Signal Corps, U. S. Army, will follow Mr. Welch. He has been designated by the Chief Signal Officer to attend the convention and will have much information for you on the subject of National Defense, or other developments that might happen between now and the actual convening of the Convention. Mr. Pitcher informs us he is very gratified in having the Signal Corps designate Col. Grable to meet with the Association and has forwarded his thanks to Army officials.

Secretary-Treasurer C. C. Deering will discuss "National Problems" as the last speaker to appear. He will be followed by the usual Open Forum that is so popular because of its informal attitude.

To better acquaint you with the details of the many exhibits you will see and hear during the Convention, the Editor of TELEPHONE ENGINEER is presenting in the following paragraphs the details of each exhibit reserved at press time of this issue. They expect you to visit them and we hope you will as it should prove of much profit to find out what is new and to extend past friendships.

Acorn Insulated Wire Company will show a complete line of their drop wires in room 2514. Edward George

Pioneer Banquet Entertainment Committee

R. C. Reno, Chairman
Ray W. Smith, Sec.-Treas.
W. S. Cadwell
T. S. Gary
James H. Kellogg
W. J. Pfaender
E. Winston Rodormer
Norman S. Shenk
E. O. Link

E. M. Blakeslee, Chairman of U.S.I.T.A.'s Toll Compensation Committee.

TRAFFIC CONFERENCE

Mr. Ray W. Smith, Editor
Telephone Engineer
Chicago, Illinois

Dear Mr. Smith:

The traffic conference is scheduled to begin at 9:00 A.M. on Thursday morning, October 16, and the theme of which will be "The Telephone Company's Activities in Connection with National Defense." An address entitled "A Chief Operator Prepares for National Defense" will be presented by Miss Mary Kammer of Freeport, Illinois. Miss Esther Hummel of Springfield, Illinois, will discuss "Handling an Abnormally High Toll Traffic with Limited Facilities." Mr. Richard Ross, Traffic and Commercial Superintendent of Portsmouth, Ohio, will discuss "A New Method of Voice Training." An open forum for the benefit of general discussion of traffic problems will be conducted by Mr. Harry W. King, Muskegon, Michigan.

L. F. SHEPHERD
Chairman, Traffic Committee

The program for this year has been designed to afford the discussion of present and future traffic problems confronting the telephone industry with special emphasis to those questions which deal with the industry's part in national defense. I trust that from this letter you will be able to secure the information desired.

Very truly yours,

COMMONWEALTH TELEPHONE COMPANY
L. F. SHEPHERD
Chairman, Traffic Committee

E. C. Blomeyer, member, Executive Committee, Chairman Depreciation Committee and Vice-Chairman Defense Co-ordinating Committee.

from the home office in Brooklyn, New York, will be here to greet telephone men.

•

American Steel And Wire Company's representatives will be on hand to greet all those attending the 45th Annual Convention of the United States Independent Telephone Association. In its exhibit room, 2527 will be a display illustrating "Controlled Quality" in the manufacture of Amertel Telephone Wires and Amerstrand Steel Strand. The high tensile wires, Amertel 85 and 135, will be featured. This company extends an invitation to make this room your headquarters during the Convention.

J. H. Agee, member of Executive Committee, Chairman of Wage-Hour Committee.

★

THE EXECUTIVE COMMITTEE

Carl D. Brorein, Chairman—Tampa, Fla.
J. H. Agee—Lincoln, Neb.
W. M. Angle—Rochester, N. Y.
E. C. Blomeyer—Chicago, Ill.
J. P. Boylan—Rochester, N. Y.
G. B. Foscue—Chicago, Ill.
W. C. Henry—Bellevue, Ohio
F. R. McBerty—Galion, Ohio
M. K. McGrath—Chicago, Ill.
J. F. O'Connell—Madison, Wis.
R. A. Phillips—Sioux City, Iowa

★

R. A. Phillips, member, Executive Committee and Chairman of the Separation Methods Committee.

•

Automatic Electric Company will feature an attractive display of Monophones, automatic telephone equipment, a novel exhibit of construction materials and supplies, and examples of Autelco Rebuilding on telephones and switchboard apparatus. Field representatives will be present from various parts of the country, and operating men are cordially invited to drop in at any time to enjoy an easy chair and friendly chat.

•

L. M. Berry and Company, Telephone Directory Specialists and Directory Publishers, will display in their rooms —2555-A and 2556-A, Stevens Hotel, a complete line of directories in which they sell the advertising. Because of

F. R. McBerty, member, Executive Committee

the large number of directories of all sizes and styles which they handle, covering over 3,000 cities and towns in twenty states, it is well worth the time of those interested in good telephone directories to visit this exhibit.

•

Buckeye Telephone & Supply Company will feature both reconditioned and new telephone supplies and is to be located in room 2536-A. The display will be even more complete than last year and will have several reconditioned P.B.X. switchboards which should be of particular interest at this time as well as their reconditioned telephone instruments.

•

The **A. B. Chance Company** will be in their same room No. 2558-A at the Stevens Hotel, October 14, 15, 16, 17,

W. M. Angle, member, Executive Committee.

to greet their old friends and customers. They will exhibit cable rings, steel expanding anchors, Never-Creep anchors, a new reversible point pike pole, and the Tips Tugger. Stop at their room 2558-R for your Patriotic Pocket Protector.

•

Channell Splicing Machine, San Marino, California, will display a new cable terminal, designed for lashed cables, which does not require wiped joints, lead sleeves, branch joints, or terminal tail. On display also will be the Channell Terminal Repair Kits and the Channell Splicing Machine.

•

Churchill invites you to use its telephone booth for free local telephone calls. Just as it has done for many years, Churchill, manufacturers of telephone booths and wood work for the telephone industry, will have one of its booths on display in the main lobby on the Convention floor. Spencer Gullicksen, Churchill's vice-president will be on hand.

•

The **Coffing Hoist Company,** Danville, Illinois, manufacturers of the well-known "Safety-Pull" ratchet lever puller and other Utility Maintenance tools, will have a display in room 2559. Mr. H. N. Hayes, District Sales Manager, will be in charge and the display will consist of a complete line of Coffing products used in the telephone industry.

•

Cramer Posture Chair Company's complete line of office and operators chairs will be shown in room 2564. Mr. Ed. F. McClure from the Kansas City office will be here for the first time to meet Independent telephone people.

•

W. C. Dillon & Company, Inc., Chicago, announces that they will show a new shunt dynamometer recently perfected in their laboratories. Among other products that will be on display are the anchor locater, anchors, dynamometers, and temperometers which products over a period of years have become well known throughout the telephone industry. W. C. Dillon will be in attendance.

•

The Electric Storage Battery Company will have an interesting display in Room 2516, Stevens Hotel. Not only will there be an exhibition of cells designed to show the construction of Exide-Chloride, Exide-Ironclad and Exide Tytex Batteries used in telephone service, but there will also be demonstrated an Exide Charge Control Unit, used for automatically controlling the charge received by a storage battery.

•

The famous **Fansteel-Balkite** telephone battery charger will be on display in room 2515. A feature of this rectifier is the indestructible tantalum condenser. Carl Howard from the home office in North Chicago, Illinois, will be their representative and he invites you to his demonstrations.

•

General Cable Corporation will exhabit and demonstrate wearing qualities of its various types of drop wire in room 2503. In addition, a complete exhibit of cable and wire will be shown. You are cordially invited to the interesting demonstrations here.

J. F. O'Connell, member, Executive Committee.

The Gray Manufacturing Company will display its telephone pay stations in Room 2516-A. In attendance will be T. Frank Cassidy, Telephone Sales Manager, who informs us that he plans in addition to the display to show a number of photographs of pay station installations and statistics on pay station returns.

•

W. A. Hammond Drierite Company, Yellow Springs, Ohio, invites all telephone men to its exhibit in room 2562. On display will be this company's product which is used for drying a cable splice by absorption of all moisture from the wires, insulation, bandages and surfaces inside the sleeve. W. A. Hammond will represent the company.

J. P. Boylan, member, Executive Committee.

M. K. McGrath, member, Executive Committee.

G. B. Foscue, member, Executive Committee.

The **Holtzer-Cabot Electric Company,** manufacturers of ringing and interrupter equipment for telephone exchanges, will have an exhibit in room 2529-A. They will have on display a variety of units representative of this special equipment.

•

Highlights of the **Kellogg Switchboard & Supply Co.,** exhibit this year will be a new and unique type of graphic demonstration to describe the simplified operation of Relaymatic switchboards and their new Ringing Filters for vibrating ringing machines. The demonstration will allow visitors to make their own calls and see, by means of a lighted display panel, how the Relaymatic completes the connections. A visual demonstration will show how the new Ringing Filter smooths out ringing current. The exhibit will also show some of the products that Kellogg is making for the Army, Navy, Aviation Industry, Signal Corps, etc.

Glamor in the person of DOLLY ARDEN, formerly in George White's Scandals, will greet you at the Pioneer Banquet.

John C. Larkin, of the firm bearing his name, invites you to his room—2558. Mr. Larkin and his associates are well known public utility consultants with headquarters in Syracuse, New York.

•

Leich Sales Corporation—Rooms 2511, 12, 13 and 14 will contain a complete showing of Leich Switchboards, Telephones and Construction Materials. Company officials and representatives in attendance will include R. W. Siemund, A. C. Reid, R. G. Faulhaber, W. S. Cadwell, H. Jester, C. M. Bowling, Bill Mossman and Cal Sweet.

•

Lenz Electric Manufacturing Company will again be in room 2517 with a complete exhibit of telephone and switchboard cords, cables, and wires. Mr. Philip C. Lenz, vice-president of the company, invites you to come in and chat while you are attending the convention.

•

Loomis Advertising Company will have on display in room 2510 some of the directories it sells, including Kansas City, Fort Wayne, and other directories which carry an all-time high in revenue. Interesting charts covering several of these directories showing the company's accomplishments during the last ten years will be exhibited.

•

Lorain Products Corporation will again exhibit its interesting line of Sub-Cycle Ringing Converters and auxiliary apparatus in Room 2515-A which will be presided over by Fred J. Heavens, Sales Manager, and C. P. Stocker, Chief Engineer. This concern now has its ringing converters in use in every state of the Union.

•

National Carbon Company, Inc., will have an attractive exhibit in room 2553-A, and will display "Eveready" "Columbia" Long Life Telephone Dry Cell Batteries—"Eveready" "Air Cell" Batteries for operator's transmitters—"Eveready" Flashlight Batteries and "Eveready" "Sta-Way" Insect Repellent Lotion. Representatives in attendance—J. J. Burke, C. C. Joslyn, R. L. Hasbrook and E. F. Schulz. Large juicy delicious apples will be presented to delegates visiting the exhibit.

•

National Telephone Supply Company will have an exhibit in which they are featuring a new sleeve never before shown. Telephone men will be par-

(Please turn to page 60)

COMMERCIAL CONFERENCE

J. T. CARLISS

Mr. Ray W. Smith, Editor,
Telephone Engineer

Dear Mr. Smith:

The program for the Commercial Conference to be held on Thursday morning October 16th is not yet quite complete. I am not able to give you the specific information requested, however, the talks to be delivered at this Conference will be given by men who are outstanding in the Commercial activities of telephone companies located in different parts of the United States.

There will be many good subjects discussed and, the list of subjects so far proposed constitutes a cross section of Commercial Operations that cannot fail to bring to the members of the Association answers to many of the problems which are daily confronting them. Some of the subjects to be discussed are: "Public Relations," "Small Exchange Conversions," "Meeting Telephone Requirements Under Limited Facility Conditions," and, "Do We Give Our Toll Business The Attention It Requires."

I trust the above information will, at least, give you a lead to the type of program which is being prepared.

Thanking you very kindly and with the best of personal regards, I am

Yours very truly,

J. T. CARLISS
Chairman Commercial Committee
U.S.I.T.A.

Highlights of the Communications News

Important Communications developments of the past month, briefed for busy readers

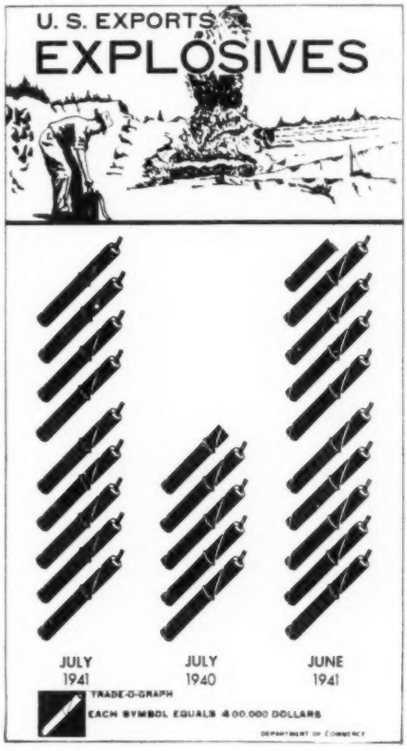
by

ROLAND C. DAVIES

Editor, Telecommunications Reports

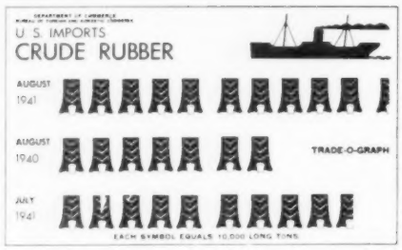
THE tremendous value of the United States Independent Telephone Association to its membership and all Independent telephone companies has been demonstrated most successfully during the past year in the handling of the many complex and difficult problems of the telephone industry in the National Capital. With the Association commencing a new year of activity following its convention in Chicago, these advantages and benefits from the organization will certainly be carried on because the telephone industry during the coming year will face many rocky shoals and rough water as the United States becomes more and more involved in the war imbroglio engulfing the world.

One of the most important achievements on which the USITA leadership has been working during the past summer and fall—the formulation of a high defense priority rating for operating telephone companies in securing materials and equipment to maintain uninterrupted service and to permit essential civilian growth—is now nearing its final stages. This devising of a formula to give the telephone industry priority status for its apparatus and equipment has resulted from numerous conferences during recent months between high American Telephone and Telegraph Company executives and USITA leading officials with a group of top-ranking authorities of the Office of Production Management. The USITA representatives in these conferences have been composed of the Association's Defense Coordinating Committee of which Carl D. Brorein, Association President and President of the Peninsular (Tampa, Florida) Telephone Co. is Chairman and its members being E. C. Blomeyer, Vice President of Theodore Gary & Co. as Vice Chairman; J. H. Agee, Vice President and General Manager of the Lincoln, Nebr., Telephone and Telegraph Co.; Col. Gustav Hirsch of Columbus, O.; and J. F. O'Connell, President of the Commonwealth (Wisc.) Telephone Co.



The OPM authorities have been thoroughly convinced of the problems of the telephone industry in maintaining their service and plant, including reasonable plant expansion, during this present war emergency period. It is realized by the OPM officials that the telephone service is not only essential for the military needs but is an imperative factor in civilian defense and morale and Priorities Director Donald Nelson is understood to have studied the telephone situation personally and to be deeply interested in bringing about a solution of its equipment needs. That the telephone is regarded as an indispensable cog in the national defense machinery is demonstrated in every maneuver of the Army such as those which have been going on during September in Louisiana and Texas and in the air raid warning tests which are in progress during the first half of October all along the Atlantic seaboard.

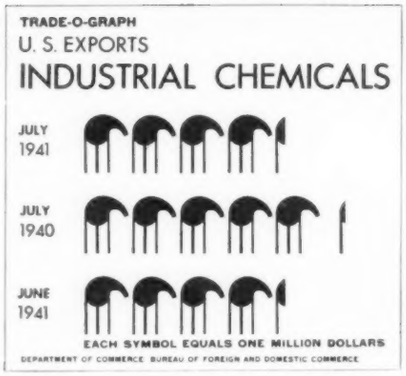
BECAUSE of the importance of the telephone industry in national defense, the OPM is now establishing a special communications section in its organization. The new Deputy Priorities Director who will be the chief aide to Mr. Nelson, James S. Knowlson, President of the Stewart-Warner Radio Manufacturing Co.



of Chicago and President of the Radio Manufacturers Association, is slated to be the key man in OPM in the formulation of policies on communications. The indications are that a program of allocating strategic materials and metals, like, copper, zinc, steel etc., on the basis of past needs of of the telephone industry is to be evolved by OPM and the present method of granting priority requests for individual telephone companies as their equipment requirements arise will be scrapped. Another organization to expedite the priority needs of the telephone industry has also been established in the form of the Defense Communications Board's priority liaison committee, composed of government officials who will be advised by two industry representatives—L. G. Woodford, A. T. & T. Chief Engineer and Assistant Vice President, and Louis Pitcher, USITA Executive Vice President.

Heavy Tax Burden

THE tax burden upon the telephone industry with the enactment of the new tax bill is going to impose a tremendous load upon the companies, particularly **many of the smaller companies.** Unfortunately, because the government's spending program seems unending, even higher taxes appear in sight—a new tax bill is to be introduced in Congress before the end of this year which undoubtedly will increase the load on industry with probably the feature of a compulsory payroll levy for defense savings as one proposal and higher excess profits taxes which will strike hardest on the bigger companies. The new tax law imposes a surtax on the first $25,000 of surtax net income and 6% on companies with more than $25,000 net income. The Treasury Department will undoubtedly make a stiff fight to secure its single method of computing excess profits taxes by the invested



capital method in the coming tax bill, but the present indications are that Congress—as it has in the past—will resist a single method and will continue the alternative means of the average earnings basis along with invested capital.

Limited Corporate Profits

The recent proposal of Secretary of the Treasury Morgenthau to limit corporate profits to 6% on invested capital with 100% taxation on all earnings above that rate of return—a move apparently backed by President Roosevelt—aroused instantaneous Congressional opposition of a formidable nature, including such leaders on Capitol Hill as Chairman George of the Senate Finance Committee. This would appear to doom any immediate chances of such a policy's adoption. For the telephone industry the 6% rate of return limitation would not hamper its operations, because that level is generally accepted by the industry due to its being under regulation. But the Morgenthau proposal would be injurious to the telephone companies in case of the plant which has been built during the past year for defense purposes since there is a growing feeling on the part of the regulatory agencies, the state commissions, that a higher level of earnings should be allowed so that this defense telephone plant can be amortized at a speedier rate out of them.

Reduce Excise Tax

THE only ray of sunshine in the taxbill came in the reduction of

(Please turn to page 72)

Convention Dates

South Dakota Telephone Association, Hotel Carpenter, Sioux Falls, October 8 and 9.

United States Independent Telephone Association, Hotel Stevens, Chicago, October 14, 15, 16 and 17.

Independent Pioneer Telephone Association, Hotel Stevens, Chicago, October 16.

Virginia Independent Telephone Association, Hotel Roanoke, Roanoke, October 23 and 24.

North Carolina Independent Telephone Association, Pine Needles Inn, Southern Pines, October 27 and 28.

South Carolina Independent Telephone Association, Lafayette Manor, Myrtle Beach, S. C., November 3 and 4.

Florida Telephone Association New Florida Hotel, Lakeland, November 7 and 8.

Alabama Independent Telephone Association, November 13 and 14.

Tennessee Independent Telephone Association, Hermitage Hotel, Nashville, November 17 and 18.

Kentucky Independent Telephone Association, Brown Hotel, Louisville, December 12 and 13.

Wire Chief's TRAINING COURSE

SECTION VIII

Open Wire Construction

(Prepared Expressly for TELEPHONE ENGINEER by the Lincoln Engineering School)

Open Wire Lines

LINE wires are attached to insulators by means of "ties" and unless these are properly made the line wire may be damaged and eventually break at the insulator.

Copper wire is particularly easily damaged by a poorly made or a non-standard type of tie.

Due to the basic difference between the physical characteristics of iron and copper line wire, radically different types of ties are employed.

The standard iron wire tie is shown in Fig 1. A twelve inch length of iron wire (ordinary BB line wire is satisfactory) is bent in the form of a horseshoe and placed around the insulator as shown in Fig. 1. Using both hands the two ends of the tie wire are bent upward and given about three turns around the line wire as shown. The surplus ends are then cut off close to the line wire, being careful not to nick the line wire. Some companies prefer to bend the surplus wire ends back toward the insulator rather than cut them off. However, this is not a standard practice. It is claimed that if the ends are not cut off it will be much easier to remove the tie wires when the line wire is eventually replaced by new wire.

The new high strength steel wire

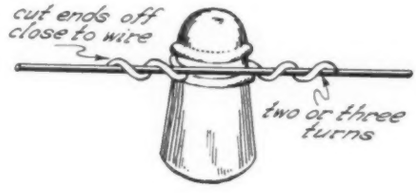
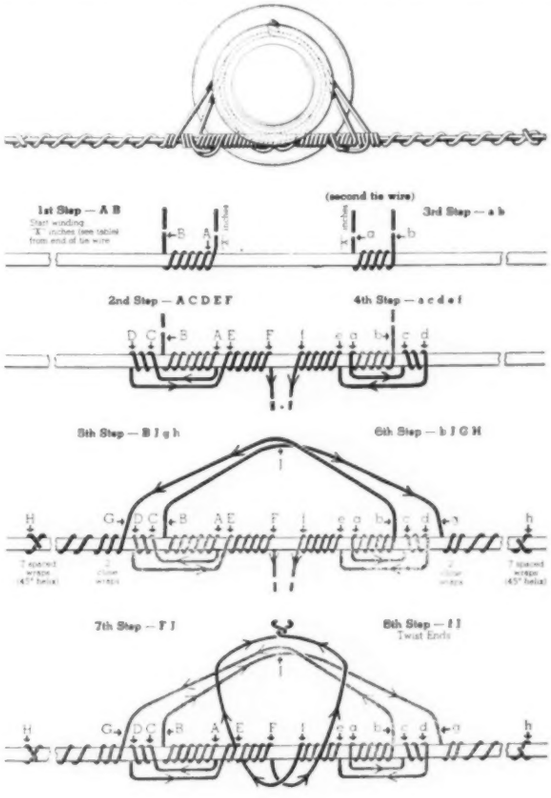


Fig. 1—Standard Iron Wire Tie.

Fig 2—Armor Tie for Steel Wire. (Courtesy American Steel & Wire Co.)

Fig. 3—The "T" Tie for maximum length spans of Steel Wire. (Courtesy American Steel & Wire Co.)


1st Step — A B
Start winding "A" inches (see table) from end of tie wire
(second tie wire)
3rd Step — a b
2nd Step — A C D E F
4th Step — a c d e f
5th Step — B J g h
6th Step — b J G H
7th Step — F J
8th Step — I J
Twist Ends

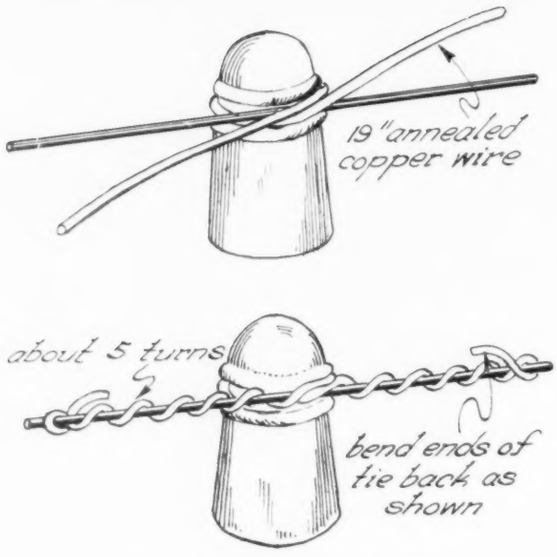


Fig. 4—Standard Copper Wire Tie.

should not be used for tie wire as it is too "springy" for this purpose. Always use galvanized BB wire or the regular iron tie wire which can be purchased from the supplier.

Special Iron Wire Ties For Long Spans

FOR spans of 200 feet and longer using the new high strength steel wire, it is recommended that an armor tie be used. The armor tie has several advantages, viz:

1. It tends to stiffen the line wire in the insulator groove thus providing better distribution of the line wire stresses.

2. The line wire is protected against abrasion with the tie wire during periods of severe vibration.

The armor tie is made by placing the middle of a 44 inch length of BB iron wire (size 109) against the line wire at a point corresponding to the center of the insulator. Wrap tie wire around line wire so that the section of line wire along the insulator groove will be completely covered. Then place the wrapped section in the insulator groove and make a half turn of each free end of the tie wire around the glass and bring the free ends over the line wire forming three close wraps and three spaced wraps. Bend the wire end back against the line wire as shown in Fig. 2.

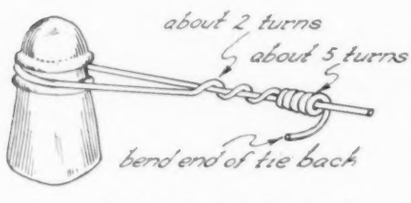


Fig. 6—Usual Method of Dead Ending Iron Wire.

The "T" Tie for Long Span Construction

ANOTHER type of armored tie developed for use with maximum length spans of high tensile strength steel wire is the "T" tie. This tie requires two tie wires (each 38 inches long) applied as shown in Fig. 3.

The advantages offered by the "T" tie are the same as those mentioned for the armor tie. The "T" tie should be able to give better protection however on exceptionally long spans subjected to heavy ice and wind loads.

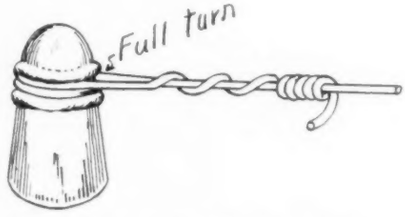


Fig. 7—Alternate Meihod of Dead Ending Iron Wire. (Not standard.)

Referring to Fig 3 start winding at one edge of insulator and at the middle of the tie wire. Proceed as shown in step No. 2.

Next repeat with the second tie wire as shown in step Nos. 3 & 4. Then make half turns around insulator with the two free ends and wrap around line wire as shown in the 5th and 6th steps of Fig. 3. The ends at point H and N should be cut off ¼ to ½ inch beyond the final twist. Last bring the two free ends F and f around to the back of insulator and twist together in a clockwise direction and cut off ends ¼ to ½ inch beyond final twist.

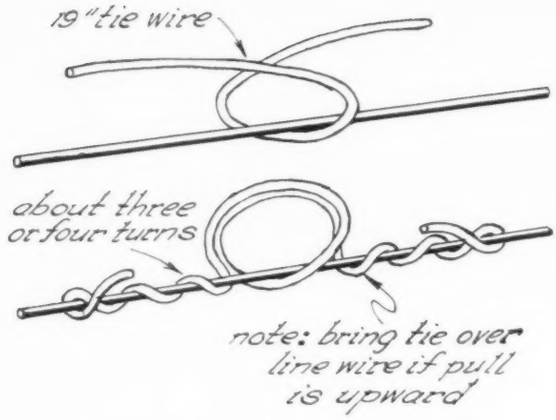


Fig. 5—Modified Horseshoe Tie for Copper Wire.

The Copper Wire Line

COPPER wire is more likely to be damaged due to careless handling than is iron wire, hence greater care must be exercised in handling.

Special annealed copper wire should be used to tie in copper line wire. The tie wire should be of the same gauge as the line wire and approximately 19 inches in length. There are two ties in general use which are known as the (1) **standard tie,** and (2) **modified horseshoe tie.** The modified horseshoe tie is used only where there is a pronounced up or down pull on the line wire. Figure 4 shows the several steps in tying in copper line wire using the standard tie.

Five complete ties should be given each end and the short ends turned back as shown.

Pliers should not be used to make the tie and when starting the tie the two ends of the tie wire should be pulled tightly around the line wire so as to hold it snugly in the groove.

Modified Horseshoe Tie

In the modified horseshoe tie the starting position of the tie wire is reversed and the free ends are brought over the top of the line wire if the "pull" on the line wire is upward, and they are brought under the line wire when the pull is downward. A study of Figure 5 will reveal that this tie minimizes the possi-

(Please turn to page 63)

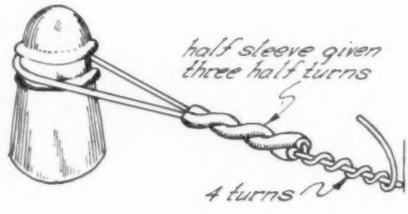


Fig. 8—Use of Sleeves to Dead End Copper or Iron Line Wire.

Testing Switchboard Circuits and Equipment

(Conclusion)

By J. S. REED, JR.

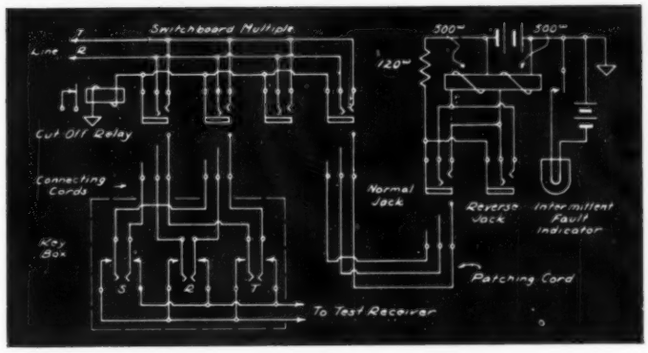


Fig. 9—Circuit of Multiple Jack Test Unit.

Checking Relay Operation in Common Battery Switchboards

WHEN circuit trouble is caused by faulty operation of relay equipment, the most satisfactory way of correcting the trouble is to utilize the **current flow set** described in the section on testing instruments or re-adjust the defective relays.

A typical current flow set is prepared for making the desired tests as follows: After connecting the set to winding of the relay under test and the external current source, the shortening switch on the first rheostat key is closed and the corresponding slides on the rheostarts adjusted to establish a desired current value for the first operating condition. The shortening switch is then opened and the one on the next key in order is closed. The second set of slides is adjusted to obtain a different current value to set up the next operating condition. The other keys and rheostat slides are handled in the same manner if necessary to obtain other current values for additional operating conditions. The operation of the relay can then be tested under successively different conditions by operating the proper rheostat keys in the desired order.

To illustrate the procedure followed in checking relay operation, let us assume that a certain relay is to operate under the following conditions: **Soak** on 120 milliamperes for 10 seconds, **release** on 0.5 milliampere in three seconds, **operate** on 40 milliamperes, for hold at least five seconds when the current flow is reduced to 2 milliamperes, and then release.

The current flow is prepared for the test in the following manner: The relay winding is connected to the proper terminals on the set with the current source connected to the winding either through the set or externally in series with the winding. The no. 1 slides on the rheostats are adjusted with the shortening switch on Key No. 1 closed until a current of 120 milliamperes is obtained. With this shortening switch opened and the one on Key No. 2 closed, the no. 2 slides are adjusted to obtain 0.5 milliampere. In a similar manner, slides no. 3 and no. 4 are adjusted to result in current values of 2 milliamperes and 40 milliamperes, respectively. With all of the shortening switches open, the set is now ready for operation.

Key No. 1 is depressed for 10 seconds to soak the relay on 120 milliamperes. This key is then released and Key No. 2 quickly depressed to obtain 0.5 milliampere. The relay should release within 3 seconds. Key No. 3 is next depressed to operate the relay on 40 milliamperes, then released, and No. 4 quickly depressed for 2 milliamperes current flow in the relay winding. This being a hold condition, the relay should not release before the end of five seconds. The operations described may be repeated if necessary until adjustments of the springs and the armature result in correct relay operation.

Another procedure makes use of current interruptions of one-third to one-half second intervals to test hold and release characteristics of the relays. Adjustments of the relay are made so that the relay will not release on short current interruptions, but will do so on slightly longer interruptions. Current interruptions are made by tapping the keys at the desired rate.

When a number of different types of relays operating under varying conditions are to be tested, it is usual to provide a relay adjustment chart which shows the proper current values for different operating conditions of the

Relay		Arm Travel	Resi dual	Adjustments					Notes
Code	Resistance				Soak	Leak	Oper	N Oper	Rel	
E 902	1 500~	035		Amps			027	021		Test from T term of winding
	2			Ohms						
114 B	1 97~			Amps			010	009		Oper 125-M of cord under test Test in series from T & G
	2 97~			Ohms						
125-M	1 87~	0375		Amps			070	060		Test from sleeve of cord under test
	2			Ohms			196	245		
149	1 34~	030		Amps			025		007	Test from sleeve of coil cord
	2			Ohms						
B-34	112 000~	020		Amps			001		0003	Test from B-1 contact on E 902 relay Apply Batt
	2			Ohms						

Fig. 10—Adjustment Chart for Testing Relay Operations with Current Flow Set.

relays. Figure 10 illustrates a typical adjustment chart used in adjusting relays in the cord circuit of a toll switchboard. It will be noted that this chart contains other information such as the coil resistance, armature travel, and code numbers of the relays.

With reference to the various terms used to denote operating conditions of the relays, **soak current** is a heavy current intended to saturate the magnetic circuit of the relay, usually to detect a sticking condition of the armature as the result of insufficient residual or other cause. **Leak current** is a very low value of current simulating leakage current (possibly from adjacent circuits or due to foreign potentials.) **Operate, non-operate, hold,** and **release,** obviously refer to the armature action of the relay.

Relay Adjustment

RELAY adjustments are very easily made when the current flow set is used to check the adjustments. The adjustments affecting relay operation are usually armature spacing (or travel), amount of armature residual, and armature spring tension. Armature spacing is usually measured and set at the value given in the adjustment chart. Spring tension is adjusted by slightly bending the armature spring (commonly associated with the contact spring assembly) with duck bill pliers or a special bending tool useful for working in cramped spaces. Excessive spring tension is indicated by the failure of the relay to function on the "operate" current value; and in sufficient tension, by failure to release on the "release" current value or on opening the circuit to the relay winding. By bending the spring in or out as required each time, a point is quickly reached when the relay operates and releases in the desired manner.

Conclusion

AS brought out in the foregoing discussion, the proper care of switchboard circuits and equipment requires the use of adequate testing instruments and the following of suitable procedures in clearing trouble. Good instruments that will make all the necessary tests are invaluable, and proper knowledge of the use of the test instruments is essential. The test procedures to follow depend to some extent upon the instruments available for the tests and also upon the skill and ingenuity of the maintenance man. The important thing is to be consistent in using methods that experience and common sense have shown to be effective and prompt in clearing faults.

In addition, the maintenance man should make it a habit to refer to circuit diagrams in tracing trouble. Not only does this save time in searching for the fault, but through this practice a thorough knowledge of switchboard circuits is obtained. This knowledge is very valuable in acquiring an understanding of the possible causes of trouble and their probable location.

The maintenance man should be particular in the care of the testing equipment. Cases of false trouble have occurred because of the faulty operation of the test set resulting perhaps from an exhausted battery, worn cords, or other defective components of the test equipment. Such mistakes can be avoided only by checking the condition of the instruments before starting a test.

General System Keeps Pace

The largest group of Independent telephone properties, the General Telephone Corp. System, has kept pace with financial gains in the telephone industry, reporting improvements in its second quarter operations over the similar period last year. It was indicated that the General's consolidated net income for the six months ended June 30 will be from $1,215,000 to $1,250,000, equal to between $1.60 and $1.65 a share on 637,701 shares of stock, after providing for full dividend requirements on 175,000 shares of $2.50 cumulative convertible preferred stock.

The General Telephone Corp, has been accruing for a 30 per cent federal income tax but has not provided for excess profits liabilities. These earnings would compare with $985,593 in the first half of 1940, or $1.26 a share on 640,801 shares of common stock after providing for regular dividends on 75,513 shares of $3 perferred stock.

Calculating on the basis of the 12 months period ended June 30, this showing, it was surmised, would place net income between $2,270,000 and $2,300,000, or between $2.94 and $3.03 a share on common stock. General Telephone controls 16 companies in as many states, and, like the Bell System, has this year met a demand for more telephone service, especially in areas of army camps or defense production. For the first half of 1941, operating companies added 22,825 stations to their lines. The construction budget for this year was raised to nearly $12,000,000, instead of the $10,500,000 earlier estimated as necessary. Proceeds from the April sale of 40,000 shares of $2.50 preferred stock will be used to increase the system's equity in its subsidiaries or for loans to operating companies.

PLANT CONFERENCE

F. E. BEHM,
Chairman of the Plant Committee

Mr. Ray W. Smith, Editor
Telephone Engineer

Dear Mr. Smith:

Following is an outline of the program of the Plant Committee, which will be given at the coming National Convention:

1.—K. B. Schotte Jr., Assistant to the General Manager Kittanning Telephone Company, Kittanning, Pennsylvania.

Subject—"Buried Cable Without Protection".

2.—W. E. Lawton, Secretary-Treasurer and Manager Viroqua Telephone Company, Viroqua, Wisconsin. Subject—"Why Tape Armored Cable".

3.—F. J. Baker, General Superintendent The Home Telephone and Telegraph Company, Fort Wayne, Ind. Subject—"Army Air Base Telephone Facilities".

4.—R. S. Brewster, General Traffic Superintendent The Lincoln Telephone and Telegraph Company, Lincoln, Nebraska. Technicolor Movie—Installation of Transcontinental Armored Cable.

Yours truly,
F. E. BEHM,
Chairman, Plant Committee.

QUANTITATIVE DESIGN OF CENTRAL OFFICE EQUIPMENT FOR SMALLER TELEPHONE OFFICES

(Continued)

By JAY G. MITCHELL

WHILE there are a great many other items of useful information that are very helpful to the quantitative designer of Central Office Equipment it is felt that the items listed are almost essential and are such that any telephone operating staff can, with the exercise of care, readily compile them from the observations made in the office affected. The fullest cooperation will be gladly extended by the manufacturers of Central Office Equipment and, when the time has arrived at which specifications are to be drawn and bids submitted, it will be found that the manufacturers will undoubtedly wish to make up their own studies and their own data as to the conditions to be met. In the smallest offices which propose to use the simplest type of Central Office Equipment many of the items of required data may be assumed as averages developed on the basis of past experience in similar offices. In larger offices where the installation of common battery manual or dial equipment is contemplated it will be safer to thoroughly study and analyze the conditions to be met by the new equipment even if it is found necessary to ask for help from experienced neighboring large telephone companies or other sources.

In using average values it is well to remember that an adequate Factor of Safety is to be applied to the estimated results. This is because of the law governing the degree of variation from average results in any field of this sort. This law, neglecting the mathematics for the present, is to the effect that the degree of variation from the average is greater when the number of events used in computing the average is smaller and is less when the number of events used is greater. In other words the **average number** of telephone calls in simultaneous existence in any given office, for instance, is more likely to be exceeded at times when the total number of calls averaged has been small than it is when the total number averaged has been large. The slightest consideration will make this evident in the personal experience of each reader. The application of this law to the reduction of service requirements in a telephone office to **quantities of equipment** in office design is obvious and it enters into almost every element of the design.

It is, of course, often the case that the quantitative design of Central Office Equipment is undertaken as a study of the situation by the management of the telephone company without any immediate intention of contracting for the purchase of the equipment. In such cases accuracy is essential, of course, but certain refinements such as the definite determination of the exact average equipment holding time on the average call for each of the several types of equipment that would otherwise be given consideration may be deferred. In such cases an approximate average result for each of the three types, Magneto, Common Battery Manual and Dial may be employed in the preliminary study leaving the development of this refinement and other similar ones as to its effect on the cost of the equipment to be demonstrated later by the several bidders.

Initial Number of Circuits

THE basic factor in the quantitative design of any telephone office is, of course, the number of circuits to be served. For that reason the first essential in the data required for the intelligent planning of a telephone office, whether the study is to be made the basis on which bids for equipment are to be requested or is to be the basis of executive budgetary consideration, is the number of circuits that are to enter the office. This has therefore been assigned the premier classification in the simple list of required items of office data above.

The circuits which are to enter the office under consideration must be terminated on the Main Distributing Frame. Each cable pair will require a pair of easily accessible terminals and that fact, of course, fixes the capacity in Main Distributing Frame Terminals. However the Main Distributing Frame itself must be so designed as to occupy no more floor space than can be economically assigned to it. This limitation imposes the necessity of so arranging the required number of cable pair terminals as to fix the dimensions of the Main Distributing Frame at a point which will be workable but not unduly extensive.

There are two general types of Main Distributing Frame each of which possesses certain advantages. In each type there are certain possible variations which have been slowly evolved by ex-

perience. In general the termination of the outside cable pairs on the terminals of the Main Distributing Frame is designated as the "A" type of frame. The termination of the outside cable pairs on the protectors of the Main Distributing Frame is designated as the "B" type of frame. In both the "A" type and the "B" type of frame the terminals, as distinct from the protectors, whether connected to the outside cables or to the switchboard cables leading to the balance of the Central Office Equipment may be mounted vertically or horizontally. It seems to be the generally accepted practice to mount the terminals vertically in offices serving less than seven hundred lines and to mount them horizontally in offices serving more than seven hundred lines. These are points which the designing engineer will settle according to his own ideas always bearing in mind that certain cabling arrangements are preferable for certain types of equipment. For illustration, in deciding on the type of Main Distributing Frame the designing engineer may, profitably, consult the manufacturers of Central Office Equipment because their experience with their product enables them to offer advice which accords with the best results where their equipment is used. In general is it believed that, except in very large offices, the height of the Main Distributing Frame, in cable pairs, should be limited to the extreme of two hundred pairs if possible and it is the author's opinion that this height should be adjusted to the number of pairs in the entering cables. This is because of the facility attained in numbering when the Main Distributing Frame verticals have a height in cable pairs which either corresponds to the number of pairs in the main entering cables or is a multiple of the number of pairs. For illustration if the entering cables are all one hundred pairs and other space considerations permit then the Main Distributing Frame may well be either one hundred or two hundred pairs high. On the other hand if the main entering cables are one hundred and fifty pairs then the Main Distributing Frame may well be made one hundred and fifty pairs high but a Main Distributing Frame three hundred pairs high, even when sufficient head room is available, is to be discouraged if any possible alternative can be found.

The **iron frame work** of the Main Distributing Frame should, in the authors opinion always be installed at least 20% in excess of the number of outside cable pairs to be connected. It is not to be overlooked also that there are occasions when an excessive number of cable pairs are to be initially terminated because of cable swinging operations or other reasons. Such occasions call for the installation, of course, of more Main Distributing Frame iron work and cable terminals than can be later justified but the excess must be provided for temporary use. The 20% normal excess capacity of iron framework will ordinarily be sufficient to serve additional circuits although the number of such circuits should, of course, be most carefully checked and provisions made for their termination. Since the Quantitative Design of Central Office Equipment is the topic under consideration at this time no comments are to be made as to types and details of the Main Distributing Frame, the protectors or the cable termination. Consultation with manufacturers will place the designing engineer in position to adapt his design to the requirements of his office.

(TO BE CONTINUED)

CONVENTION SPEAKER

STANLEY W. FORAN

Stanley W. Foran who will address the USITA convention in Chicago is particularly suited for a job of this type. His occupation as an executive of an advertising agency puts him in the same category as most of us—selling service.

About 3½ years ago the Dallas (Tex.) Lions Club called on him as a member to deliver an address on "Americanism — Let's Re-Sell It." After this speech which received statewide attention, Mr. Foran, whether he knew it or not, was headed for the Big League in lecturing and speaking.

What is it he has to say? It is an affirmative, not a negative, story, he has to tell. He is not defending the American system; instead, he is presenting in a challenging way the merits of that system. He contrasts Americanism with other "isms." The results will speak for themselves. Hear him!

Personals

Joseph E. Byrne, secretary of the Wisconsin State Telephone Association, is receiving congratulations on the report carried in his bulletin to members explaining the necessary details of the new federal tax on telephone bills. We are reproducing the form he enclosed in his Bulletin in another section of this issue.

Kemp Haythorne, the wire man known so well in the Independent industry, is now with the U. S. Rubber Company and we hope to see him at their exhibit during the coming National Convention. Kemp is a Texas product and we still enjoy spinning yarns with him.

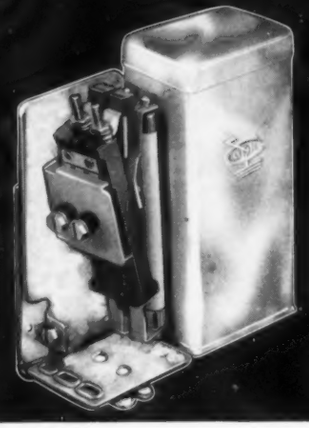
M. C. Atkins, manager of the La Grange, Texas, exchange of the Southwest Telephone Company, should be happy these days as the new switchboard expected for his improvement program was scheduled to be delivered along about now.

Dave O'Malley, Chicago theatrical booking agent that is handling the entertainment talent for the Pioneer banquet, is very enthusiastic over the entire program and the well known acts to be presented. One of them is a thriller that will keep you on the edge of your chair.

Dink Robb, manager of the Electra (Tex.) Telephone Company and amatuer photographer extraordinary, is expected to handle the new press camera for TELEPHONE ENGINEER during the national convention. Complete flashlight equipment for candid shots will make Dink busy and happy.

What Subtlety

A telephone man traveling touring Europe sent back a picture post-card bearing this message—"Dear Son: On the other side you will see a picture of the rock from which the Spartans used to throw their defective children. Wish you were here . . . Your Dad"



SOMETHING NEW

. . IN SUB-STATION PROTECTOR DESIGN

THE ONLY sub-station protector with an air gap arrester* on both the instrument and line side of the fuse, thus providing dual protection.

The only sub-station protector with a demountable protector unit facilitating quick repair, replacement, and removal from idle party lines.

The only sub-station protector built of steel and Bakelite, thus eliminating the possibility of ceramic breakage.

The only sub-station protector with a "standard" protector unit which is interchangeable with related protection equipment, such as pole cable terminals, open wire drain arresters, and central office main frames.

The only sub-station protector with completely grounded hood, bracket, and frame.

These and many other exclusive features have been incorporated in the new Cook Type R Sub-station Protectors—Type RO for outside installation and Type RI for inside use.

All these improvements are available to you at prices comparable with ordinary sub-station protectors.

Order a sample today for inspection at no obligation.

Sold by all telephone equipment manufacturers and supply houses.

**A heavy bronze blade to carbon gap of .010" spacing for grounding heavy sustained power line shorts is placed on the line side of the fuse. The Cook Tru Gap is located on the instrument with .007" spacing for static drain.*

LOOK FOR COOK

at the Convention. Suite 2532-A Stevens Hotel, October 14-17. See the Trans-Mount System panorama—a dramatic visualization of improved telephone protection and economy!

COOK ELECTRIC COMPANY

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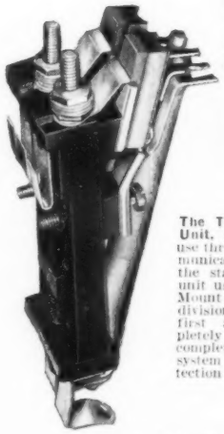
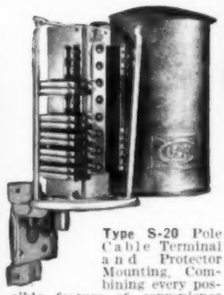
EQUIPMENT COVERED BY U. S. LETTERS PATENT NUMBERS 2,171,351; 2,223,539 and 2,223,540.

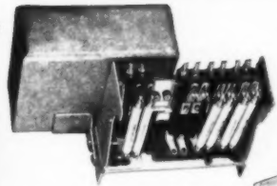


The Type H Protector Unit, already in wide use throughout the communications industry is the standard protector unit used in all Trans-Mount System apparatus divisions, providing the first and only completely interchangeable, completely standardized system of telephone protection and distribution.

Type T Main Distributing Frame and Central Office Protector Mounting for the protection, distribution and cross connection of paper wrapped lead covered cables. No silk and cotton switchboard cable tip is required. Both primary and secondary protection are provided. Furnished in 26, 52, and 104 pair units.

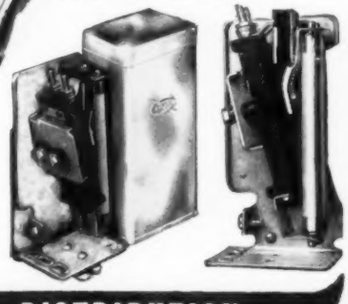


Type S-20 Pole Cable Terminal and Protector Mounting. Combining every possible feature of convenience and accessibility for installation, servicing and maintenance. Expertly engineered and ruggedly constructed to give maximum satisfaction.

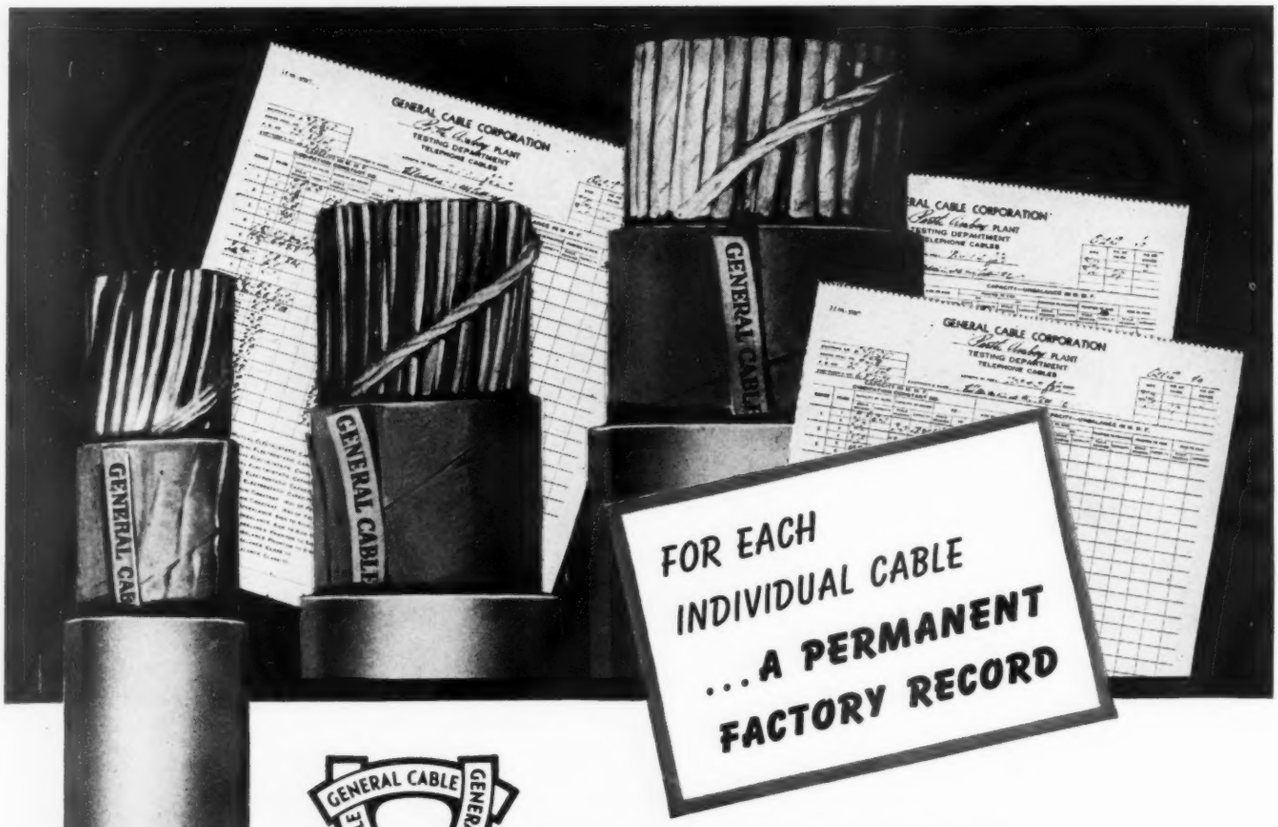


Type U Utility and Sub-Station Protector Mounting. Provides protection for small cables and open wires up to 5 pair per unit at railroad crossings and power line crossovers and parallels. Compact, convenient. Mounting bracket so arranged that base unit may be brought to a horizontal position to facilitate wire connections.

Type RO and RI Sub-Station Protector Mounting for two applications. Type RO for outside mounting on post, wall, etc., equipped with bracket and Endurite coated weatherproof hood. Type RI furnished without the hood for inside or weather protected outside mounting.



THE *TRANS-MOUNT SYSTEM* OF PROTECTION AND DISTRIBUTION



PAPER TELEPHONE CABLES

The individual test records on each length of Paper Telephone Cable manufactured by General Cable certify the exact history of its making and factory testing. Telephone cables are a very specialized product, in which the component materials and manufacturing technique greatly affect life and serviceability. General Cable's experience in the manufacture of Paper Telephone Cables is registered and reflected in permanent factory test records.

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A TYPE FOR *Every* USE!

The Monophone line is most complete in modern handset types for every possible use and application. There are models for desk, wall or shelf mounting; for use indoors or outside; for special applications such as elevators, mines, quarries, taxi stands; special transmitters for excessively noisy locations; even explosion-resisting models for refineries, explosive plants, and similar applications. Furnished, of course, for straight line, harmonic or code ringing, and for magneto, manual or automatic operation.

The Type 40 Desk Monophone

The Type 50 Wall-Mounting Monophone

These telephones are characterized by the superb modern styling which distinguishes all Monophone models, and their design includes such outstanding features as molded plastic construction, "all-positions" capsule type transmitter and capsule type receiver, extra built-in structural strength for long life and minimum breakage, decorative chromium bands for better appearance, specially-designed anti-sidetone circuits for highest quality voice reproduction, etc. Examine the Monophone carefully — look into every detail. We believe you'll agree with us when we say it's the finest telephone ever built!

THE TYPE 1A DESK MONOPHONE
for use with separate bell box.

"TWO LINE" MONOPHONE with switching and holding keys.

THE TYPE 8 MAGNETO MONOPHONE
a "self-contained" desk type.

OUTDOOR MONOPHONE SET
with weatherproof all-metal case.

THE TYPE 43 COMPACT MONOPHONE
for desk or wall mounting.

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FROM A COLLAR BOX...TO THE TRO

FIFTY YEARS OF DEVELOPMEN

Strowger Automatic Ide

One day, toward the end of the last century, a Kansas City business man named Almon B. Strowger sat at his desk carefully sticking pins into a pasteboard collar box to form an evenly-spaced row. He had an idea that a metal finger, fastened to a center shaft, could be brought into contact with successive pins by means of step-by-step rotation — and that telephone connections could be completed thereby, using an electromagnet and ratchet wheel to turn the shaft.

This crude device marked the beginning of what is now known as the Strowger Automatic, or step-by-step, telephone system—by means of which 75% of the world's dial telephones provide speedy, accurate service to their users. The smooth-acting, incredibly fast Strowger switch of today is — in its fundamental principle of operation — the direct descendent of Strowger's crude collar box mechanism.

From this root has sprung a great m
The movement is one of easing t
drudgery of hands and arm. The in
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AUT
RIGINATOR

MAKERS OF TELE NE, SIGN

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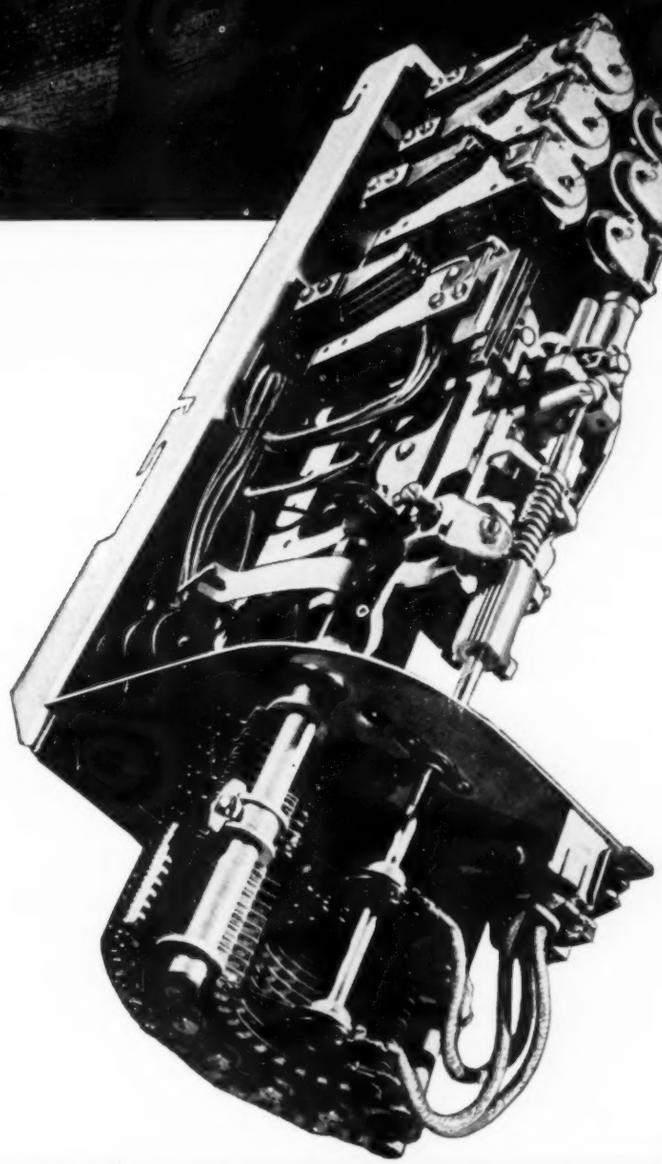
E STROWGER SWITCH OF TODAY...



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Idea . . .

ng great movement and a great industry. of easing telephone operation from the l arm. The industry is that of supplying the ic equipment required for the gradual mod- telephones. As the pioneer in this movement actur of Strowger equipment, we are con- phone betterment everywhere, as we always

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with the famous "center cut" construction.

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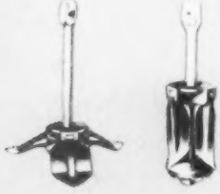
insure line joints of maximum strength.

ESTWING HATCHETS AND HAMMERS
forged in one piece from fine tool steel.

OAK PINS AND BRACKETS
—their fine quality insures long life.



DILLON ANCHORS
contribute to profitable exchange operation.

TAYLOR-COLQUITT AND BLACK BEAUTY POLES—
"tops" for service and long life.

★

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TELEPHONE SUPPLIES AND MATERIALS!

● More than ever before, good telephone supplies and construction materials are an important matter to every telephone company. Lines must be kept in shape—service must be maintained up to top standards. And the most practical—and in the long run, the most economical—way to do this, is to buy and install only the finest telephone-designed products that are obtainable.

That's "where we come in!" For years we have built up our supply service on the basis of nothing but the finest. Every item we sell has been carefully selected by men long experienced in the operating field, as being the best of its kind. Whatever you buy from us—from pliers to pins and poles—you can rely upon to be (1) designed specifically for telephone use; (2) a product of a nationally known and highly reputable manufacturer; (3) competitively priced for quality merchandise.

We'd like to do business with you, no matter how modest your wants. Ask us to quote prices and give you detailed information on particular products in which you are interested.

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ARKANSAS ASSOCIATION MEETS IN LITTLE ROCK

—HAS MOST SUCCESSFUL CONVENTION—

THE Arkansas State Telephone Association convened September 22 and 23 at the Arlington Hotel, Hot Springs, Arkansas, to present what many visitors report was one of the most entertaining and instructive programs in the history of that organization.

President S A. (Gus) Lane, perennial president of that Association, was re-elected. W. M. Graham, president of the Rison and Kingsland (Ark.) Telephone companies was elected vice-president and Curtis Stout, state manager of the Southern Telephone Company, Stuttgart, was elected secretary and treasurer. Directors elected were L. E. Lemmerhirt, Prescott. Ark.; George McConnell, Green Forest, Ark.; Lamar Bailey, Sheridan, Ark.; James Thompson, Danville, Ark.; and W. E. Gosdin, Little Rock, Ark.

S. A. Lane, re-elected president of the Arkansas Association.

Although the Editor did not get to attend in person our reporter informs us that Gus Lane proved to be a wonderful host with genuine Southern hospitality. The program he arranged was well attended with many prominent speakers addressing the Convention

Heard on the first day was a welcome by Mayor Leo P. McLaughlin of Hot Springs and a response by Mr. Graham of the Rison and Kingsland Ark., Telephone Companies. Mr. Lane then made his annual address and was followed immediately by a paper on "Telephone Citizenship" delivered by Blake Downie, assistant general attorney, of the Southwestern Bell, Little Rock. The Defense program was discussed by Captain Corr, Signal Corps Officer of the U. S. Army and the national situation by Louis Pitcher, executive vice presedent of the U. S. I. T. A.

Following the secretary and treasurer's report committees were appointed and a round table discussion was held. The delegates were then invited to participate in a fish fry and chicken barbecue at the Majestic Lodge on Lake Hamilton, for the evening.

Charles Evans public relations department of the Arkansas Power and Light Company of Little Rock, made the Principal address on the morning of the second day to be followed by a report of committees, elections of officers and directors, general discussion and then adjournment.

Snortin' Ridge Out of Snorts

When, in June, the Ohio State Utilities commission looked over the Snortin' Ridge Telephone Co., Fairfield County, and its equipment, the verdict was: "Poles and wire prostrate and incapable of further service." Consequently, the nation's smallest utility was struck from the commission's list.

Years back, the company claimed 20 patrons on its 10-mile circuit and the hopes of a future hook-up with the Amanda. O., exchange. Ray Bussert's general store was the terminus of the line. An Amanda phone in the store made it possible for Snortin' Ridge patrons to contact the outside world by having their conversations relayed by either Mr. or Mrs. Bussert.

Unable to make the necessary connections with Amanda, the company's patrons began deserting it three years ago and recently, the organizers dissolved it.

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Autelco Rebuilt
The MARK of QUALITY
IN REBUILDING
SERVICE
This
HANDSET
Wall Telephone
Only $11.75
plus your old magneto set
Try to top this value anywhere! A rebuilt and modernized "compact type" magneto telephone, newly equipped with Monophone handset and anti-sidetone circuit. If you have no telephones to trade, write for cash prices.
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TELEPHONE, SIGNALING, AND COMMUNICATION APPARATUS

Conducted by B. C. BURDEN, Technical Editor

Line AND Desk

Drop Wire

Q. Is it necessary to use rubber tape on a drop wire splice?

A. Yes, rubber tape is necessary to insure good insulation and prevent leakage during wet weather. Use two reverse layers of ¾" rubber tape and two layers of friction tape.

Q. Is there any way in which drop wire which passes through trees which cannot be trimmed can be protected against damage?

A. A good method of protecting drop wire against abrasion is to slip a piece of loom (used in light and power wiring) over the drop and fastened in place at the point the wire is in contact with the trees. This method is illustrated in Figure 1.

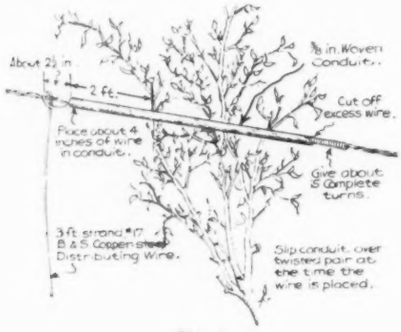

About 25 ft.
2 Ft.
To in Woven Conduit.
Cut off excess wire.
Place about 4 inches of wire in conduit.
Give about 5 complete turns.
3 ft. strand #17 B & S Copper-steel Distributing Wire.
Slip conduit over twisted pair at the time the wire is placed.

Fig. 1

Q. What is the transmission loss of No. 17 copperclad steel drop?

A. No. 17 copper steel wire has a loss of about 1.7 decibels per mile. With respect to transmission and resistance limitations it is very much like No. 22 ga. cable.

Q. Is it good practice to distribute both protected and unprotected circuits through the same cable terminal.

A. When conditions otherwise permit the use of unprotected circuits they may be fed from the same terminal as protected circuits. In fact terminals designed for this kind of distribution are now available in the product of several manufacturers.

Transmission and Crosstalk

Q. How much loss would result on a long 104 copper toll circuit from bridging a telephone station and line, 10 miles long to the toll line at some intermediate point?

A. The combined loss of the station and bridged line would be approximately 1.0 decibel.

Q. How much leakage is permissable on standard toll lines?

A. The old requirement was 10 megohms per mile but the standards are now higher, and 32 megohms per mile is now considered good practice. That is, each mile of line should read not less than 32,000,000 ohms. On a toll line 100 miles long the insulation resistance reading should be 320,000 ohms or better. The wire chief's voltmeter readings can be converted into ohms per mile by the following formula:

$$X = \left\{ \frac{ER}{d} - R \right\} l$$

Where X=ohms resistance to earth per mile
E=test battery voltage.
R=voltmeter resistance
l=length of toll line in miles
d=deflection in volts

Q. What are the impedance characteristics of non-pole No. 104 copper and iron circuits in dry weather?

A. The characteristic impedance of 104 copper is 677—J141. This is the effective resistance is 677 ohms and the reactance is negative and is 141 ohms. No. 109 iron has an impedance of 1450—J600.

Q. Why are point transpositions used on some toll circuits?

A. A point transposition provides a better crosstalk and inductive interference balance than the rolling due to the fact that the line is actually rotated 180 degrees at a specific point rather than throughout two spans. There is therefore less chance of irregularities due to sag, etc. Point transpositions are especially valuable on power telephone parallels of less than road width separation and on joint poles.

Q. I wish to make up a pad which will be approximately equivalent to one mile of No. 22 gauge cable, how can this be done?

A. Simply connect four resistances and one condenser of the values shown in Fig. 1.

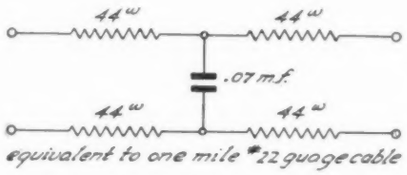


Fig. 1—Pad Equivalent to one mile # 22 ga. Cable.

Q. Please describe how a center tapped receiver can be used to detect unbalanced conditions in cable or open wire pairs.

A. An ordinary operators receiver has an extra connection brought out from the junction of the two coils. The receiver is connected to the line to be tested and with the center tap grounded will be quiet if the line is balanced when 1000 cycle tone is fed into the line as shown in Fig. 1. If one side of the line has more or less impedance then the other, the current flowing to ground through the two halves of the receiver coil will be unequal, hence, sound will be heard in the receiver.

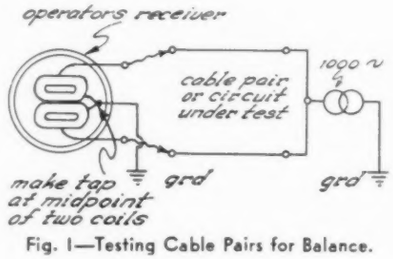


Fig. 1—Testing Cable Pairs for Balance.

Cable strippers salvage millions of pounds of valuable copper and lead.

HOW MANY LIVES has a piece of cable?

In these days of dwindling stocks of metal the reclamation of metals from discarded telephone apparatus takes on unusual importance.

Mountains of old cables, wire, telephones and switchboards that have outlived their usefulness are smelted by Western Electric's subsidiary—the Nassau Smelting & Refining Co. This yields each year millions of pounds of copper, lead, tin, zinc, antimony, nickel.

Refined and alloyed, much of this "precious" metal goes back to Western Electric to start life over again in *new* telephone equipment.

This war on waste has long been a feature of Western Electric's regular program of economy in manufacture. It is being pressed today as one of many efforts to make available all possible sources of metals that are so important to the country's national defense efforts.

Pouring ingots of reclaimed metal for use in new telephone equipment.

Western Electric

Long Lines

Conducted by
R. A. Clark, Jr.

Crosstalk Theory

This article second of a series, presents tables for computing the cross-talk in untransposed wires.

THE cross-talk between circuits on a telephone line is dependent to a great extent on the location of the wires on the lead. Circuits adjacent to each other naturally have greater coupling between them and the cross-talk will therefore be higher than where they are on opposite ends of the cross-arm.

Table 1 shows the cross-talk between physical circuits on a 40 wire line. It is shown in decibels which is the most practical form for studying such problems. You will note that all of the wires are not shown in the horizontal colums. As the pole line is symmetrical it is obvious that the cross-talk between wires 7-8 and 9-10 is the same as between wire 1-2 and 3-4. Therefore in the horizontal column the wires on the right hand side of the pole line have been omitted thus avoiding duplication of values. The cross-talk shown in the table is for a frequency of 1,000 cycles. At higher frequencies it rises approximately in direct proportion to the frequency. Table 2 shows the DB equivalents which should be subtracted from the values of Table 1 in order to determine the cross-talk at frequencies other than 1,000 cycles. For example, the equivalent between wires 1-2 and 9-10 at 1,000 cycles is 91.5 db as read from Table 1. At 10,000 cycles the cross-talk would be 20 db greater or 71.5 db.

The cross-talk values of Table 1 are based on a mile of untransposed line. If the untransposed section is greater or less than one mile corrections may be applied as shown in Table 3. This is the amount of cross-talk which should be added or subtracted from the values shown in Table 1.

As an example assume we desire to know the cross-talk between wires 3-4 and 29-30 for a half mile section of unbalance at 5,000 cycles. From Table 1 we find that the cross-talk between these circuits is 98.5 db at 1,000 cycles for a one mile section of unbalance. For a half mile section the cross-talk is 6 db less therefore the cross-talk at 1,000 cycles for a half mile section would be 104.5 db. At 5,000 cycles the db equivalent is 14 db less than at 1,000 cycles (Table 2), therefore subtracting 14 db from 104.5 gives us a cross-talk value of 90.5 db.

The above tables and calculations are quite approximate as several factors are neglected, however the tables are useful in making a quick check to determine the best circuit combinations for the operation of carrier systems.

Frequency	Subtract from 1000 cycle equiv. D. B.
2,000	6.0
5,000	14.0
10,000	20.0
20,000	26.0

Table 2—Variation in Crosstalk with Frequency per Mile.

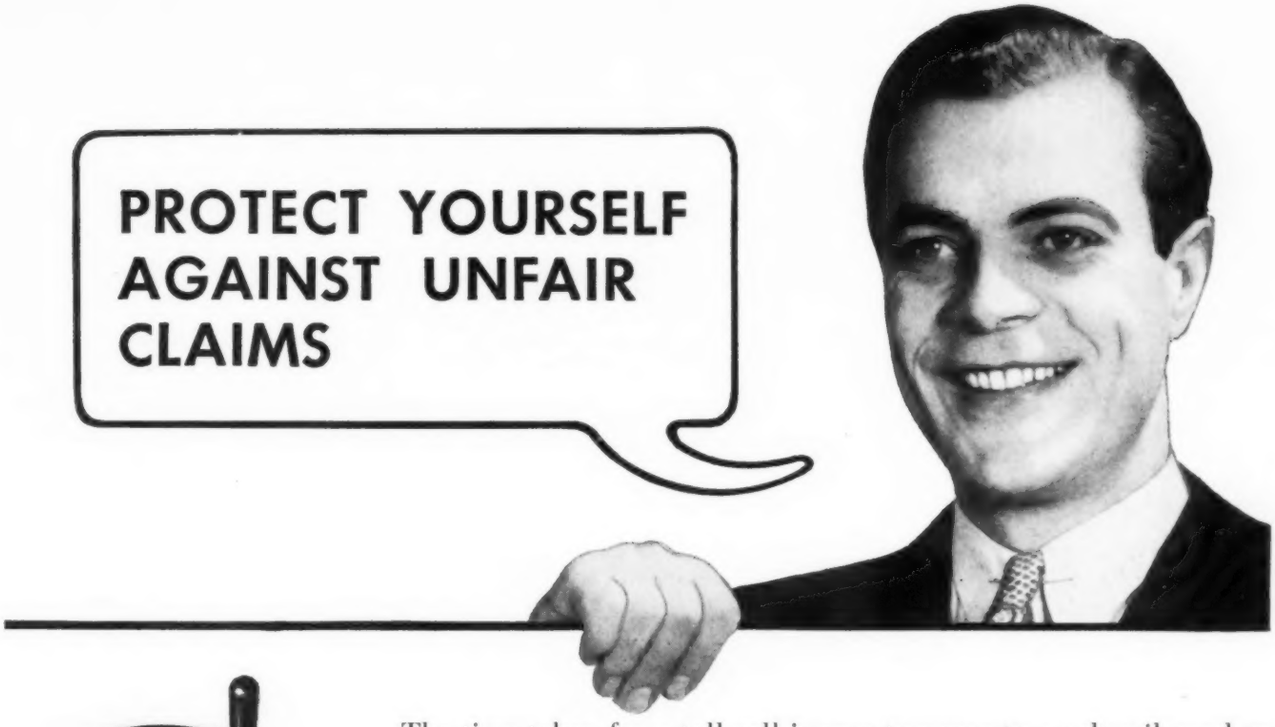
Length mi.	Add to 1 mi. value, DB	Subtract from 1 mi. value, DB
0.1	20.0	
0.2	14.0	
0.5	6.0	
0.8	2.0	
1.0	0.0	0.0
2.0		6.0
5.0		14.0

Table 3 — Variation in Crosstalk at 1000 Cycles with Length of Unbalanced Section.

	1-2	3-4	5-6	7-8	9-10	11-12	13-14	15-16	17-18	19-20	21-22	23-24	25-26	27-28	29-30	31-32	33-34	35-36	37-38	39-40
1–2		60.2	74.0	86.5	91.5	64.0	88.0	80.7	89.5	92.5	75.5	82.5	114.0	98.0	96.5	81.4	89.0	95.0	110.5	103.0
3–4			56.5	77.5	86.5	90.0	65.0	83.5	83.5	90.0	84.5	79.5	84.0	104.5	98.5	88.5	87.0	87.0	104.5	114.0
5-6				56.5	74.0	80.0	83.5	59.5	83.0	80.0	120.0	84.0	73.5	84.0	120.0	94.0	87.5	81.0	87.5	94.0
11–12							60.0	74.0	87.0	92.0	64.0	89.5	81.0	89.5	93.0	76.0	95.0	120.0	98.5	96.5
13–14								56.5	77.5	87.0	90.0	65.5	84.5	83.5	89.5	85.0	79.5	84.0	120.0	96.5
15–16									56.5	74.0	80.5	84.5	60.0	84.5	80.5	110.0	84.0	73.5	84.0	110.0
21 22												60.0	74.0	86.5	91.5	63.5	88.5	81.0	90.0	92.5
23–24													56.5	77.5	86.5	89.0	65.0	83.5	83.5	90.0
25–26														56.5	74.0	80.5	83.0	60.0	83.0	80.5
31-32																	60.0	74.0	86.5	91.5
33-34																		56.5	77.5	86.5
35–36																			56.5	74.0

Table 1—Crosstalk between Pairs in DB, at 1000 Cycles per Mile.

PROTECT YOURSELF AGAINST UNFAIR CLAIMS



Model No. 6

Spring Drive Model No. 6

Prints elapsed time in minutes and quarter minutes with 5 second indication. 8 day spring-drive, jeweled movement. Ideal where regulated A.C. current is not available or current is unreliable.

Electric Model No. 30

Prints elapsed time to the second. Choice of 12 or 24 hour time of day imprint. Same electrical characteristics as Model 33. Fits same switchboard space as No. 6.

The time taken for a toll call is easy to prove to a subscriber when you have the toll ticket on which a Calculagraph automatically printed the time of day and the elapsed time of the call mechanically calculated.

The Calculagraph eliminates the time wasted and possibility of errors made in figuring elapsed time. It assures absolute accuracy, saves disputes and increases operating efficiency.

Made in three models that give an immediate, permanent and accurate record of every toll message.

Model No. 33

This compact model (7½" by 3⅜") weighs only 8 pounds—operates on regulated current. Operator can easily determine the end of the initial period by a glance at the sweep second hand. Gives full vision of dial from any position on switchboard.

Model 33

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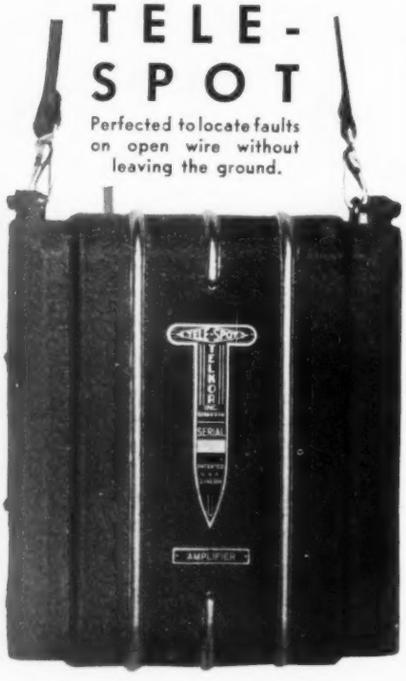
Now, while "all-out" National Defense cooperation is taxing our factory to the utmost, we wish to thank our friends and patrons for bearing with us on delivery of our sensational new product—

TELE-SPOT

Perfected to locate faults on open wire without leaving the ground.



Also locates buried cable, water and gas pipes or wiring in the walls of buildings.

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Book Review

A TELEPHONE RATE CASE. By E. D. Smith. Public Utilities Reports, Inc., 1038 Munsey Building, Washington, D. C. Price $5. 223 pp. 1941.

How does a telephone company prepare a rate case? Call in the company's lawyer, of course. But it isn't so simple as that. Neither the front office management nor other telephone company department heads can shuffle off the responsibility for a rate case to the counsel and then forget about it.

Modern regulation doesn't work that way. The rate case of today requires active and intelligent cooperation of nearly all responsible company officials; —together with a certain amount of understanding of what the rate case is all about.

How to get such information? This is the spot which a recent publication, "A Telephone Rate Case," written by Edward Devereux Smith, vice president and general counsel of the Southern Bell Telephone & Telegraph Company, is admirably suited to fill. Mr. Smith's volume is no dull or ponderous legal tome. It is essentially a practical book of reasonable size (223 pages), written in simple language which the average non-legal mind can readily grasp. Of course, it also serves as a handbook or, more accurately, a guide book for Mr. Practicing Attorney himself in picking his way through the complications of the rate case.

The points selected for discussion are those usually met with in a typical statewide rate proceeding, whether for a Bell or an independent company. Mr. Smith cites modern and ruling cases (up to January 1, 1941) which include regulatory precedents laid down in other than telephone rate cases.

The book is divided into ten chapters. The first, a relatively short chapter, deals with the status of a utility—the common law and modern theory of regulating business in general. Chapter II takes up the controversal question of Fair Value with its overtones of Prudent Investment **versus** Reproduction Cost, Going Concern Value, Tax Assessments, etc.

Chapter III deals with Revenues and Expenses. Chapter IV covers Fair Return. The Right of the Public to Reasonable Rates is the title of Chapter V. Of especially timely interest is Chapter VI on Separations and Allocations of local, intrastate and interstate business. (Board-to-board and station-to-station theories are discussed.)

Chapter VII deals with the Bell problem of intercorporate relationships. Chapter VIII is a very practical treatment on the right of a utility to stop losing operations and to relief from adverse regulatory orders in general. Equally practical is the final chapter on the preparation of a telephone rate case which takes you through all the steps from the filing of a petition or complaint to the final decree.

Unlike much contemporaneous regul-

"Must you be near a telephone every minute of the day?"

atory literature which reads like a lawyer's brief for this or that pet theory, Mr. Smith is entirely objective and therefore most helpful to the interested party who wants to know what he should do in a rate case, rather than what some author thinks ought to be done. It should prove a short cut and a headache remover to many a harassed company official suddenly confronted with the problem of going through the ordeal of a rate case.

Book Review

THE BELL TELEPHONE SYSTEM
By Arthur W. Page, Vice President American Telephone and Telegraph Company.

Responsibility to the public for continuous improvement of the largest single public utility in this country is the key note theme of this volume. Unique in the annals of business writing is this frank and forthright description of the operating policies of the American Telephone and Telegraph Company and its constituent companies which together make up the greatest communications system in the world.

Here is a book which indulges neither in whitewashing or propagandizing about how this public utility performs, but rather sets forth in simple language the achievements, methods and problems of the telephone business from the point of view of a thoroughly informed high executive of the corporation.

Every major aspect of the industry is given some consideration including problems of service, rates, wages, technology and research, relations with the government, and finance. The reader is given a clear and cogent picture of the multifarious activities of the company.

Mr. Arthur W. Page writes as a Vice President and Director of the American Telephone and Telegraph Company, which position he has held for the last fourteen years, prior to which he was Editor and Vice President of Doubleday, Page and Company, with special reference to the publication of the magazine "World's Work." Date of publication: October 1, 1941. Price $2.00. (See ad, page 67)

Thank You, Sir!

Dear Sir:

I had the good fortune to have your publication sent to me by mistake. I read it and like it so please enter my name on your subscription list.

Yours truly,
Elroy Nass
Manitowoc, Wisconsin

A STRONG SUPPORT

Rainier Crossarms have the seasoned strength that's needed to help your lines withstand the stress of severe ice and wind loads. They are made of clear Douglas Fir. Careful control of seasoning under the supervision of experts adds to the natural strength of the wood. They are practically moisture- and rot-proof—a vital factor to long-time service life.

Your GRAYBAR Man can also supply Rainier pins, brackets, etc. In fact, he can fill any of your requirements from the "top of the pole to the bottom of the hole." He offers performance-tested items from a range of types and designs so wide that you're sure to get exactly what you want. What's more, you get it *when you want it* from this "one-call" supply source.

Next time you need pole-line items, remember GRAYBAR. You'll get quality products and cooperative service no matter how large or small the item.

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Everything Electrical
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Important

Operating Companies Must Originate A-10 Priorities Applications

There appears to be some misunderstanding among telephone companies as to the manner in which priorities are applied under Preference Rating Order P-22. To clear up this matter we are re-emphasizing hereunder those parts of the procedure with which telephone operating companies are vitally concerned.

(1) Priority applications *must be originated by the operating companies.* They cannot be originated by manufacturers or suppliers.

(2) There is no such thing as a blanket priority application for any class of telephone company purchases. *Each* order for materials which come under the P-22 order must be *separately certified* by the operating company issuing the order.

(3) A telephone company desiring to apply the priority rating to a given order must endorse *all* copies of the order with the following statement:

> "PURCHASE ORDER FOR REPAIR OR EMERGENCY INVENTORY— PREFERENCE RATING A-10 UNDER PREFERENCE RATING ORDER P-22"

The above endorsement must be personally signed by a responsible official of the company designated for that purpose. Endorsements may be made by rubber stamp. The original and at least one duplicate must be sent to the supplier.

(4) Every operating company must establish and maintain a separate file for duplicate copies of such purchase orders for two years from the date thereon for inspection by authorized government representatives.

(5) Priority rating A-10 can be applied only to materials to be used in the repair or maintenance of existing telephone plant; that is, to materials to be used where there is an actual or iminent breakdown of equipment or service.

(6) As a further safeguard against misunderstanding, orders which do not come under the A-10 rating should bear the following notation: "This material for expansion of present plant facilities."

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From our large stocks at strategically located treating plants, we offer you finest quality creosoted southern yellow pine poles and prompt shipments. Your inquiries will receive immediate attention.

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"Finger Tip" Adjustments
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(No tools needed)
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EFFICIENT

CRAMER
"Air-Flow"
POSTURE CHAIR
Kansas City, Missouri

See Our Exhibit at
THE STEVENS
ROOM 2564

USITA Convention News

(Continued from page 36)

ticularly interested in this new development. Those representing the company who will be here are Fred P. Auxer, Charles Klein, Stewart Wright, Mr. Voyles and Mr. Canada.

•

The much talked about Neale spinner and slack puller for spun cable will be exhibited in room 2553. These are products of the **Neale Manufacturing Company,** Topeka, Kansas, and should prove of great interest to all telephone people who attend the National Convention.

•

The North Electric Mfg. Co., will exhibit its new and complete range of telephone instruments, showing their transmission and maintenance advantages. A small unit of North's well-known "All-Relay" dial equipment will also be in operation, so that interested parties may study its features in service and observe transmission characteristics.

•

Page & Hill Co. of Minneapolis, Minn., long identified by the telephone industry in producing highgrade Northern White Cedar and Western Red Cedar poles and responsible for all of the specifications for butt-treating of Cedar poles, will offer a new full length overall treatment using a new preservative.

Sections of these poles may be seen in the company's exhibit room No 2531 and Grant Harris and Sherman Brooks the general offices will be on hand to answer any questions regarding the new preserative.

•

Peatrophone Corporation of 342 Madison Avenue, New York, N. Y. will exhibit in the same rooms at the convention as last year; namely, 2560A and 2561A, and will show their latest models of the mechanical secretary. A very interesting time is promised to those who drop in to see these new models.

•

The **Raytheon Manufacturing Company,** will display in room 2559-A. This company is the manufacturer of the now well known RectiChargeR, a line voltage compensated dry disc constant voltage charger, and RectiFilteR, a dry disc rectifier for telephone applications. The representatives of this company cordially invite you to make their room your headquarters.

•

Reliable Electric Company are planning to present their products in the manner that has proven so popular at state conventions during the past year. This system gives a complete visual of the different products. As usual the Rodormers, the Cooks, George Morse and Paul Rhoads will be in attendance to greet old friends.

•

John A. Roebling's Sons Company will again entertain their friends in room 2530. They invite you to drop in and visit while making the rounds of the exhibits. There you will find your old friend H. O. Cauldwell to greet you and renew acquaintances.

•

The **Schauer Machine Company** of Cincinnati, Ohio, will as usual display its complete line of ELECTROX Battery Eliminators and Automatic Battery Chargers designed especially for telephone service. A new Battery Eliminator for Switch Board Operator's Sets should prove of interest to operators and managers of small exchanges. A. J. Kohn, an old time telephone man, and Mr. Kenneth Wilson, the company's Sales Manager, will be in attendance.

•

A new self-contained Handset will high light the **Stromberg-Carlson** exhibit in Rooms 2503-A to 2509-A. Shown also will be the streamlined, modernistic P.B.X. switchboards which have proved so popular, a RELAYDIAL System, Convenience Systems for businesses requiring small systems, Non-Multiple Switchboards, Construction Materials and Supplies, and Central Energy Telephones.

•

The **Suttle** exhibit will be even more interesting than usual. On display will be a complete line of their printed forms for telephone companies, the Suttle Phone, Tablephone and Crystopac. Suttle's new wire reel will also be displayed. Their exhibit room is 2555.

The **Telephone Repair Company** of which Dan McNulty is manager will be **in room 2514-A, showing Transmitter** Repairs, Rebuilt Telephone and Repair Parts, New Oak Telephone Cabinets and an oil-winding Exhibit. They will feature the remodeling of Old Style Magneto into Late Style Telephones, and converting Common Battery Phones into Enclosed Gong Sets arranged for dial.

•

Unique Manufacturing Company, Inc., room 2536: Displaying the latest in cable splicer's and lineman's furnaces, blow torches, folding safety shields, ladles, solder pots, wiping cloths, and allied items. Stop here for your free chance on the personal tool-kit torch which will be given away just before the banquet.

(END)

Pay and Hours Increase

Increases in both average pay and working hours for employees of the telephone and telegraph industries were announced for the month of July by the Department of Labor in a report released Sept. 19. Average weekly earnings for workers in the communications industry were $32.16, compared with $32.02 for June and $31.91 for May. Average hours worked per week went up to 40.7, against 40.2 in June and 40.3 in May. Average hourly earnings were reported at 79.5 cents a drop from the June figure of 80.2 and the May mark of 79.7.

South Dakota Convention

The annual convention of the South Dakota Telephone Association was held at the Carpenter Hotel, Sioux Falls, S. Dakota Oct. 8th and 9th.

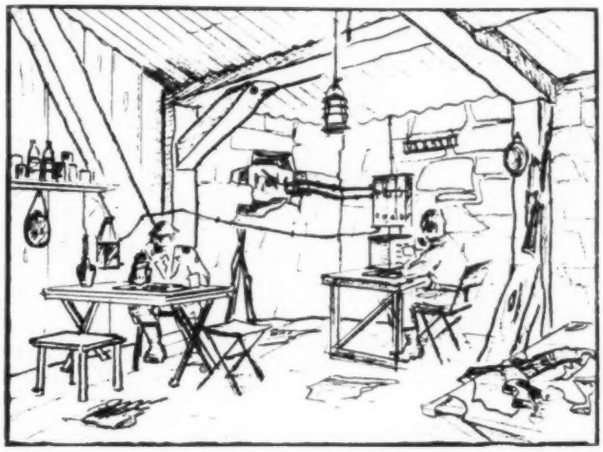
The meeting was featured by several well known speakers. L. A. Hill of Minneapolis, regional director of the wage hour division of the U. S. Department of Labor explained the workings of the law as applied to the telephone industry. J. J. Murphy, representing the utilities commission made an address on the work of his commission, stressing the importance of adequate rates for telephone companies, especially the smaller organizations.

Another outstanding talk was that given by I. D. Weeks, president of the University of South Dakota entitled "The Ramparts we defend."

Chas. C. Deering, secretary of the USITA reviewed activities of the National Association discussing in his speech many pertinent subjects such as priorities and new tax laws.

Other speakers were: R. A. Phillips, Central Electric and Telephone Co., and R. W. Ricker from the Northwestern Bell Telephone Company, Omaha.

Battle Front Scene to be Reproduced at Chicago Convention



This realistic reproduction of a field headquarters will be set up at the Chicago convention by United States Rubber Company to show the workings of a field telephone system. An appropriate movie will be shown to visitors.

A. E. Brooks Is Elected President

Albert F. Brooks, vice-president and general manager of Southern New England Telephone Co., has been elected president to succeed Harry C. Knight, who will retire Dec. 1 at the age of 65. Elmer F. Bradley, general plant manager, will take Brooks' former position.

Phone Man Weds

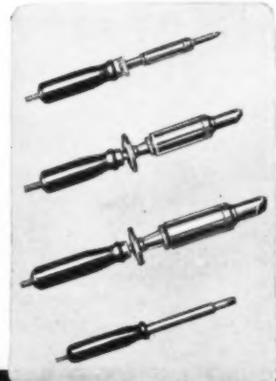
A. J. Wagner of Mount Airy, N. C., has announced the engagement and approaching marriage on October 4th of his daughter Marian Glene, to Mr. Vern Warren Chase of Front Royal, Va.

Mr. Chase is now group manager for the Virginia Telephone and Telegraph Company with headquarters at Front Royal.

"American Beauty" Irons
SOLDER THEM ALL!

There's a 50-watt midget—a 550-watt giant—or any intermediate size you need in an American Beauty.

They are so compact, rigid and sturdy as to be almost indestructible. Soldering tips are easily changed by loosening a set screw. Handles never get hot. Save with American Beauty. Start now!



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Acme Visible Records, Inc.
Acorn Insulated Wire Company
The American Appraisal Company
American Automatic Electric Sales Company
The American Coach and Body Co.
American Creosote Works of La., Inc.
American Crossarm and Conduit Company
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Minerallac Electric Company
Wm. J. Murdock Company
National Carbon Company
National Electric Specialty Company
National Fireproofing Corporation
National Lead Company
The National Telephone Supply Company
Naugle Pole & Tie Corporation
Neale Manufacturing Co.
The North Electric Manufacturing Company
Oliver Iron and Steel Corporation
Owens-Illinois Glass Company
Page & Hill Co.
The Paine Co.
Paragon Electric Co.
T. M. Partridge Lumber Co.
Philco Radio & Television Corp.
Postal Telegraph Cable Company
Putnam and Company, Inc.
Ray-O-Vac Company
Raytheon Manufacturing Company
Reliable Electric Company
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Schauer Machine Co.
Simplex Wire and Cable Company
Seymour Smith & Son, Inc.
Southern Wood Preserving Company
The Specialty Device Company, Inc.
The Sterling Manufacturing Co.
Stromberg-Carlson Telephone Manufacturing Company
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Telephone Engineer Publishing Corporation
Telephone Repair Co.
Telephony Publishing Corporation
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Texas Creosoting Company
Unique Manufacturing Co., Inc.
The Universal Clay Products Co.
Van Cleef Bros.
Wagner Malleable Products Co.
Weston Electrical Instrument Corporation
The Whitney Blake Company
J. C. Wray & Co.

Wire Chief's Training Course

(Continued from page 40)

bility of the tie working loose. This tie should be used only where there is a pronounced change in grade resulting in a down or up pull on the wire.

On some high grade copper toll lines application of the armored tie principle has been applied by using a flat copper ribbon wound tightly around the line wire adjacent to the insulator so that any abrasive action between tie wire and line wire is taken by the flat ribbon. The line wire is held in place against the insulator by a standard copper wire tie.

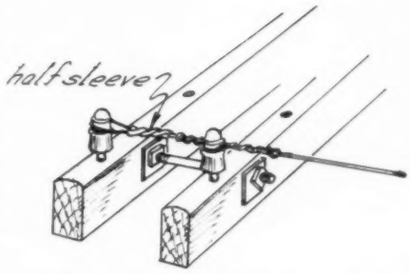

Fig. 9—Method of Dead Ending on Double Arm.

Dead Ending Methods

COPPER and iron line wires may be dead ended either by a hand make up or by means of sleeves.

It is the usual practice to dead end ordinary iron wire rural lines by means of a hand make up, consisting of a half turn around the insulator and the free half end is then given three or four long turns and six short turns around the line wire as shown in Fig. 6. It will be noted that the free end is generally turned back against the short turns as this makes it much easier to remake the dead end should this later be necessary. Some companies take a full turn around the insulator as shown in Fig. 7 as they believe this make up is less likely to slip than where a half turn is taken. However, this latter method is not standard.

The larger companies usually dead end both copper and iron wire by means of a half sleeve (or the new type compression dead end sleeve). Figures 8-a and 8-b illustrate the use of half sleeves and compression type dead end sleeves.

Where double arms are used at dead end points the dead end is made up on the back insulator in the regular manner and a standard tie placed on the first insulator. This is shown in Fig. 9.

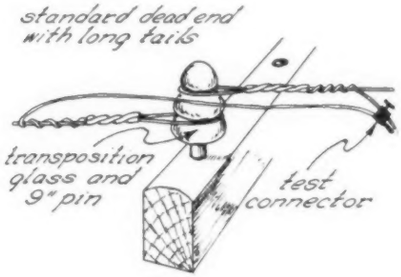

Fig. 10—Arrangement at Line Test Points.

Test Points in the Line

TO facilitate making trouble test on long open wire rural and toll lines some companies provide test points at several locations so that a circuit may be opened, thus permitting the direction in which the trouble lies being readily determined.

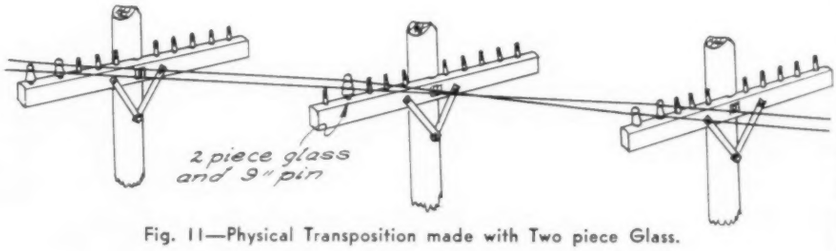

Fig. 11—Physical Transposition made with Two piece Glass.

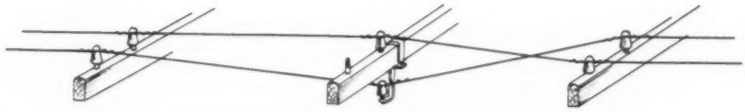

Fig. 12—Physical Transposition made with Drop Brackets.

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The telephone—then and NO

"When a Nation hurries it does it by telephone," says the advertisement on the opposite page. That advertisement is appearing currently in general magazines—reminding telephone users of the part the telephone industry plays in times of emergency.

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NOW

1941 looks at 1916

THINGS have changed a lot in 25 years and yet there is much that is the same.

In 1916 it was Preparedness; in 1941, National Defense. But now the scale is bigger, the pace faster. There was pressure on the telephone business then. The pressure is infinitely greater now. New training camps; new aviation fields; new munitions plants—all need telephones. Every one is moving faster and when a Nation hurries it does it by telephone. The Bell System spent 94 millions on new construction in 1916. It is spending more than 420 millions in 1941.

The entire Bell System organization is giving "first call" to defense. We believe you would want it that way.

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"THE TELEPHONE HOUR" IS BROADCAST EVERY MONDAY EVENING OVER THE N.B.C. RED NETWORK.

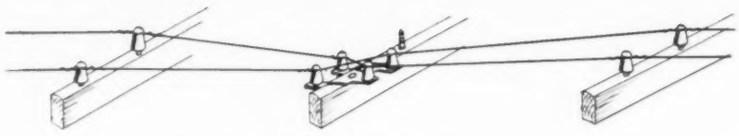

Fig. 13—Point Type Physical Transposition.

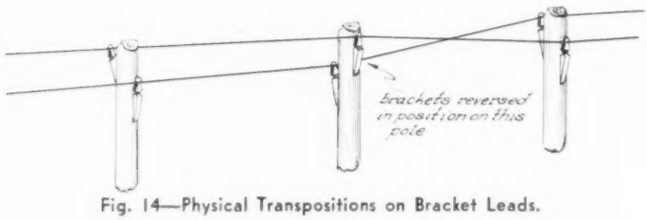

Fig. 14—Physical Transpositions on Bracket Leads.

These test points are often placed at corners and in such cases jumper wires which are connected to the line wire by means of test connectors can readily be opened for test.

Where the test point occurs at other than a corner a two piece transposition glass with the wires dead ended in each direction and connected together as shown in Fig. 10 makes an excellent arrangement.

Due to the tendency of test connectors to work loose and thus result in a high resistance contact, only a small number of test points should be used. They should be placed at strategic locations where they will be of maximum value.

Transpositions

AN important feature of open wire construction is circuit transposition. Transpositions are required in both rural and toll lines. They are not needed in the short open wire leads frequently used in the smaller towns.

A transposition is merely the interchanging of the two wires of a circuit (physical transposition), or in the case of phantom lines the change in position of the two side circuits of a phantom group (phantom transposition).

Transpositions are needed in telephone circuits to minimize crosstalk and inductive interference.

When a large number of circuits are carried on an open wire lead for a long distance the transposition arrangement becomes quite complicated. Where only a few circuits are involved or where the open wire lead is relatively short (rural leads for example) a very simple transposition scheme will be adequate.

Before discussing the number and location of transpositions for various leads let us consider how transpositions are made and the several types that are required.

Method of Making Physical Transpositions

PHYSICAL transpositions mean merely the interchange in position of the two wires of a circuit. There are three methods of making physical transpositions.

The simplest and most inexpensive is to transpose the wires on a two piece transposition glass as shown in Fig. 11. The two piece glass requires that the regular 8 inch pin be replaced with a 9 inch pin. This method of transposition is used primarily on unimportant toll and rural lines. For important toll lines the drop bracket method of making a physical transposition is standard. This method which is shown in Fig. 12 makes use of a steel bracket which drops one wire below the arm thus permitting the interchange in position of the two wires and with less possibility of them swinging together than is the case with a transposition made with a two piece glass.

A third type of physical transposition is known as the **point transposition** and is made as shown in Fig. 13.

This is the best possible type of transposition from the standpoint of its efficiency in balancing a telephone line, hence is used primarily on some of the highest grade toll lines and particularly those that have superimposed carrier circuits. Due to the expensive type bracket required, point transpositions are

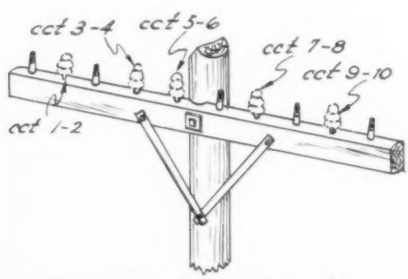

Fig. 15—Location of Transposition Glass or Bracket on a ten wire lead.

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seldom used on ordinary toll circuits.

Where a telephone line is carried on transmission line poles for several miles the use of point transpositions will be worthwhile as they provide a better balance, particularly on close exposures, than does the rolling type transposition.

Physical transpositions are made in bracket leads by reversing the normal position of the brackets on the transposition pole as shown in Figure 14. The location of transposition glass and brackets on a two pin arm is shown in Fig. 15.

Phantom Transposition Construction

Phantom transpositions are required to balance the phantom circuit to other physical and phantom circuits and to outside exposures. Inasmuch as each side circuit of a phantom in effect functions as a single conductor it is necessary to interchange the position of the two side circuits in order to transpose the phantom.

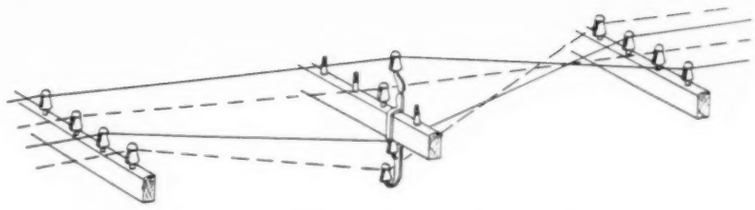

Fig. 17—Method of making the Four Types of Phantom Transpositions.

Because a phantom circuit may cross-talk into his own side circuits, it is also necessary to employ side circuit (physical) transpositions in the phantom group.

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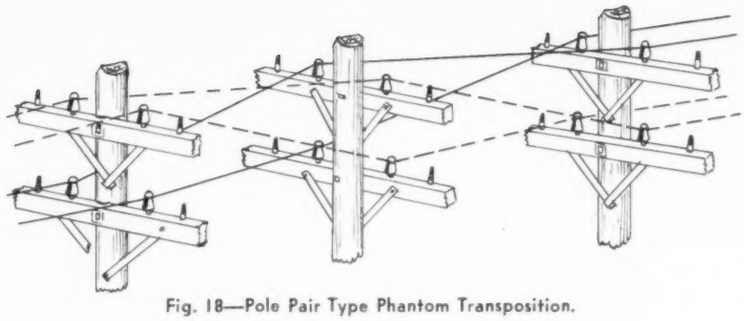

Fig. 18—Pole Pair Type Phantom Transposition.

made at the same point as the phantom transposition hence phantom transpositions are referred to as Type 1, 2, 3 or 4, depending on the arrangement of the side circuit transpositions in the phantom transposition.

The transposition schemes employed on the long haul toll leads use all four types.

The theory back of transpositions will be discussed in lessons dealing with cross-talk and inductive interference.

Phantom transpositions are made by means of three pin steel brackets which are bolted to the crossarm as shown in Fig. 16.

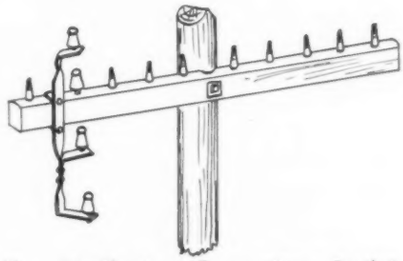

Fig. 16—Phantom Transposition Bracket arrangement.

The wire arrangement for the four types of phantom transpositions is shown in Fig. 17.

Where pole pairs are phantomed the transposition is made as shown in Fig. 18.

Wire Chief's Examination No. 8

OPEN WIRE CONSTRUCTION (Part 2)

1. **Under what circumstances should the Modified Horseshoe tie be used on a copper wire lead?**
2. **What length tie wires should be used for (1) Iron wire lines? (2) Copper wire lines?**
3. **Should the Armor Tie be used on a steel wire lead when the maximum length spans are 150 feet or less?**
4. **How should a line wire be dead ended on a double arm lead?**
5. **Of what value are test points in long open wire leads?**
6. **What is the purpose of a transposition?**
7. **What is the essential difference between a physical and phantom transposition?**
8. **Which of the three types of physical transpositions will give the best balance?**
9. **How are physical transpositions made in bracket leads?**
10. **How many types of phantom transpositions are used?**

California Pioneers Convention Bound

Among those planning to attend the coming U. S. Independent Telephone Association Convention are the officers of the California Chapter of the Independent Pioneer Telephone Association —C. F. Mason President; A. Wardman, Vice President and Geo. S. Blake, Secretary-Treasurer.

ADVERTISERS NOTICE

The November Fortnightly TELEPHONE ENGINEER will contain pictures and highlights of the NATIONAL CONVENTION. Reserve space NOW!

Your Billing Methods on the Federal Tax

Since the new Revenue Tax of 1941 was enacted into a law that provides for a 6% tax on all telephone bills effective Oct. 5, there has been much thought given to the proper method in which this billing should be done when it is presented to telephone subscribers.

These illustrated forms are those sent us by Joe Byrne, Secretary of the Wisconsin State Telephone Association. We reproduce them herewith for your benefit. In an interview with Louis Pitcher of the USITA we were told that in his opinion this form better solves the problem than any heretofore offered and that he was advising the Association Committee handling this detail, that in his opinion this form is the best he has seen to serve as a standard for Independent telephone companies.

Form 24 Rev. 8-1-41

TOLL SERVICE AND OTHER CHARGES

PLACE CALLED	Messages of Less Than 25 Cents	Messages of 25 Cents and Over and Telegrams	
		Amount	Federal Tax

Getting the Most Good from the Convention

THE best way to get the *least good* from a day at the Convention is to lie in bed the better part of the morning, then get up and after a hasty breakfast rush in late to hear the key address, which by this time is half over. After the address, away you go to the Exhibit rooms for a quick glance around. Then to lunch and a brief siesta—now its 2:30 and back to the convention floor thinking that you really should not have rested so long. You step into one of the group meetings and find yourself in the midst of a traffic conference. You wanted to attend the Plant conference but you decide its too late now so you just sit this one out. You think you should devote some more time to the exhibits but decide to put it off until tomorrow. And so goes another day.

Seriously, a National Telephone Convention deserves a carefully considered schedule if maximum good is to result from being there. By following a simple but orderly plan, a convention can be made to more than repay the cost and effort of attendance.

First you must study the program. Check off the talks and group conferences that will be of greatest interest and benefit to you and then budget your time so that you can work them all in. Be sure to arrange to attend all of the principal addresses as these are on timely topics and will be ably presented by prominent speakers who are well versed in their subjects. Be sure and attend meetings on time. This courtesy is due the speakers and only by so doing can you get full benefit from the talks presented.

Group conferences represent a chance to get specialized information on whatever phase of the telephone business that may be of particular interest to you. These conferences offer a chance to ask questions, present problems, and contribute ideas. Help make them interesting by active participation.

Equally important and interesting are the fine exhibits sponsored by the leading manufacturers and suppliers of telephone materials and apparatus. These exhibits offer a chance to become familiar with the latest developments in tools and apparatus and to get acquainted with the representative in charge. The exhibits are the life of any convention. No expense is spared at the National Convention in making these exceptionally complete and interesting. Plan on spending a substantial amount of time in every exhibit. Examine the products carefully, ask questions about their application to your specific plant problems. Tell your troubles to the men in charge of the exhibits as they may be able to be helpful and you will find them more than anxious to be of service. Now don't fail to budget plenty of time for the exhibits for they will be well worth it.

Let's all make this National Convention the best yet and show the Association officers and exhibitors that we appreciate the effort they have put forth in our behalf. Well, I'll see you there—

Signed—One Who Will Be There.

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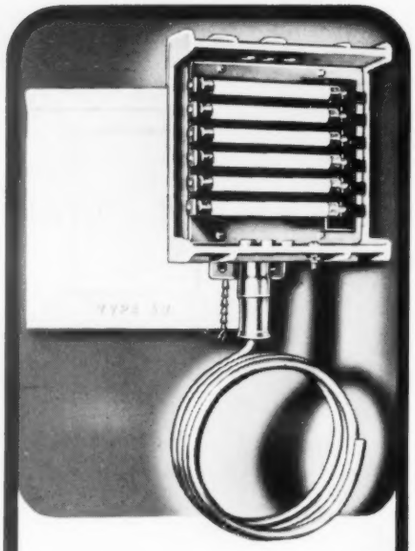

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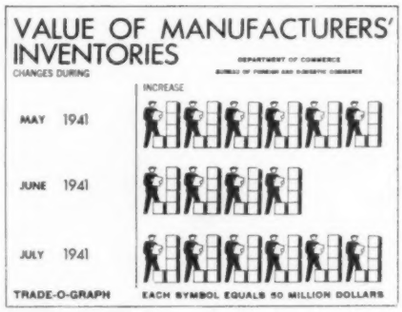
TELEPHONE SIGNALING AND COMMUNICATION APPARATUS

Highlights of the Communications News

(Continued from page 38)

the excise tax on local monthly telephone bills during the final lap of the Congressional consideration of that measure. When the bill went to conference, it contained a 10% excise tax on local telephone service, proposed by the Senate which was double the House bill's provisions of a 5% levy. Due to the effective presentation of the potential harmful effects of the 10% tax upon their subscribers and service, especially in the smaller towns and rural districts, by the Independent telephone industry, the Congressional conferees reduced the tax rate to 6%. This persuasion of Congress was achieved through personal discussions with the Congressional leaders by Louis Pitcher, USITA Executive Vice President, and Clyde S. Bailey, Washington Represenative, together with a large number of telegrams and letters from Independent companies and from the State Independent Telephone Association. The regulations and interpretation on this new monthly telephone tax were being prepared by the Internal Revenue Bureau for issuance during early October.

For long distance telephone messages, together with overseas radiotelephone calls, a tax of 5 cents for each 50 cents or fraction thereof of the charge was imposed in the new law with the tax starting at calls for which the charge is more than 24 cents. A tax of 10% of the amount of the charge was imposed on telegraph, cable and radiotelegraph messages. A similar 10% levy was placed on leased wire, TWX and talking circuit special services. Any telephone services used in the conduct of their business by telephone companies was exempt from the tax, while pay station calls and amounts paid for installations of instruments and equipment were likewise not made subject to the 6% levy on local monthly bills.



New Tax Bill

IN the coming new tax bill to be placed before Congress within a month or so, there is anticipated to be a proposal by the FCC that the telephone companies, together with the telegraph and broadcasting industries, will be taxed for their cost of regulation. In this plan the FCC is following the principle that is adopted by the majority of state commissions. However, the burden upon the telephone industry for such a FCC cost-of-regulation tax would be comparatively small, particularly in the case of the Independent industry. It is estimated that on the basis of the present FCC annual appropriation of $2,100,000 the telephone industry would only pay around $530,000 a year and practically all of that would be assessed against the American Telephone and Telegraph Company Long Lines Department and to a lesser degree against the Associated Bell System Companies, while the Independents would bear only

a very small proportion of this so-called franchise levy.

Continuing Property Record

THE war situation and the whirl of the national defense preparedness has caused the FCC to shrink each month into a role of less importance. However, because the regulatory situation has to be viewed with an eye to the future when normal conditions prevail, there are some happenings at the Federal Commission which deserve significant interest on the part of the telephone industry.

The most important affair on the FCC griddle is the plan to promulgate the long-awaited regulations for Continuing Property Record accounting for telephone companies. The regulations for this form of accounting to be added to the present Uniform System of Accounts have been drafted in tentative form by the FCC and the accounting committee of the state commissions and were distributed to the Bell System and the Independent industry for their views. The two branches of the telephone industry are to submit their comments by Nov. 15.

In the consideration of these proposed regulations, the Independent industry through the U. S. Independent Telephone Association won an important concession because the FCC seems inclined to divide the telephone industry between large and small Class A companies on a revenue basis to free the smaller carriers from any burdensome requirements.

It has been indicated at the FCC that it would be agreeable to receive the view of the Independent industry in the Nov. 15 comments on what revenue dividing line would be adequate and satisfactory. In its original proposal the USITA suggested that Class A companies having gross operating revenues of less than $8,000,000 a year should be exempted from the continuting property record accounting. Then at the recent St. Paul convention of the National Association of Railroad and Utility Commissioners, the NARUC Accounting Committee proposed a $2,000,000 dividing line. In its proposed continuing property record regulations the FCC stressed that its projected requirements were broad and flexible so as to permit the methods already in existence by any telephone companies if adequate for the purposes of regulation should be retained.

THE only other matter of importance for the telephone industry on the FCC program is the resumption during mid-October of the studies by the FCC and state commission committee and staff on the best method to determine the separation between interstate and intrastate revenues, expenses and property. This study was commenced last June and a program of inquiry into the various formulae and steps for

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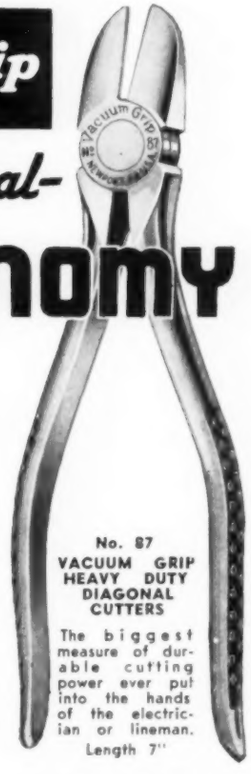

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25 YEARS AGO THIS MONTH

Taken from TELEPHONE ENGINEER files of OCTOBER, 1916

Twenty-five years ago Einar A. Brotos, electrical engineer for the Western Electric Company, Ltd., London, Bell Telephone Manufacturing Company, Antwerp, and the Western Electric Company, New York, paid a visit at the office of TELEPHONE ENGINEER.

▼

More than 300 members of the Indiana Independent Telephone Association were present at the opening of the tenth annual convention of the association in Indianapolis, September 14, 1916. An address of welcome was given by Mayor Bell who thanked the Independent telephone companies for the work they had done toward the development of a greater Indiana.

▼

Earnings of the Lincoln (Neb.) Telephone & Telegraph Company during the fiscal year of 1915-16, ending June 30, reached the sum of $1,285,769, not including miscellaneous revenues from other than operating sources. The operating expenses were $826,889. This left $458,880 of net revenue.

▼

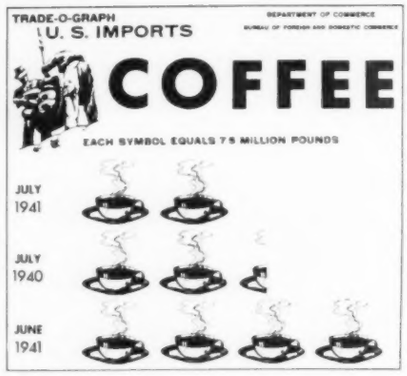
The 5,000 rural telephone lines of Iowa during 1916 won a victory over the electric lines of the state in a decision by the state railroad commission that telephone companies then operating had priority rights over future electric lines.

▼

The Stromberg-Carlson Company during 1916 reported that business was excellent and that the demand for its different types of local battery switchboards was exceptionally active.

▼

The quick recovery of British wounded during 1916 was facilitated by the invention of the telephone probe, an instrument which located the presence of bullets or pieces of shrapnel in wounds by establishing an electric contact with the metal and giving an audible noise.



the determination of separation was devised during the summer. Now the Federal and State Commission groups will commence the actual mapping of separation methods. Later the FCC-State Commission committee plans to call in for suggestions and consultation the representatives of the Bell System and Independent industry. Out of these studies it is hoped to evolve a method of separation which will become the standard plan for all of the regulatory bodies.

Acquisition

After several months of intermittent hearings during last spring and this summer, the FCC has completed its inquiry into the proposal of the New Jersey Bell Telephone Co. to acquire the capital stock of the Imperial Securities Co., a subsidiary of the Theodore Gary & Company, which would be the first step towards the objective of consolidating the Keystone Telephone System at Philadelphia and in Southern New Jersey with the Bell System Companies in those areas. Under the plan the Keystone Co. in Philadelphia would be merged with the Bell Telephone Co. of Pennsylvania and the Keystone subsidiaries operating in New Jersey would be fused with the New Jersey Bell. The several hearings of the FCC on the acquisition of the Imperial Securities Co., which controls the Keystone System, produced only slight opposition to a consolidation of the Keystone properties with the Bell companies which was based upon the lower business rates offered by Keystone in Philadelphia. In general, the view prevailed in the testimony at the hearings that the move would be a good thing from the public viewpoint because it would terminate the sole remaining situation in an American city of duplicate competitive telephone service.

Army-Navy Toll Rate

Another FCC event of interest was the deathknell sounded for the proposal of reduced toll rates at Army and Navy camps and bases. This plan, sponsored by Pennsylvania Commissioner Richard Beamish, while it held potential political support, was killed after both the War Department and the Defense Communications Board declared it was impractical and would be most difficult of operation. The Beamish proposal which was also advocated by Tennessee Commissioner Jourolomon was the subject of two FCC-State Commission conferences and also was a sensational part of the recent NARUC convention. Secretary of War Stimson himself rejected the idea.

British Patent for Sending Television by Code

A television code system which could be used in wartime to send confidential maps, charts or photographs has been perfected by Adolph H. Rosenthal, of Kensington, England, who was awarded a U. S. patent (No. 2,251,525) on his invention recently. The sending set scrambles the image to be transmitted, so that only those receivers operating under proper code signals can form a comprehensive picture from the impulses received.

The camera teletube picks up the picture to be broadcast and converts it into electrical impulses in the usual manner. The scanning of the image is scrambled, however, by scanning a code pattern with a second pick-up tube and utilizing the impulses of the code image to control the scanning of the material going out. At the receiver, a similar pattern, synchronized by a scanning tube, unscrambles the irregular impulses and forms an image identical with the object picked up at the transmitter.

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This valuable prize goes to the one who guesses closest to the number of single-conductor feet of

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Telephone Wire purchased from U. S. Rubber Company by the Signal Corps of the United States Army, from Jan. 1, 1941, to date.

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This is accomplished in the rectifier cell itself. No relays or special circuits are necessary. Balkite, therefore, is the only low cost taper battery charger.

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Following are prices of typical Balkite Rectifiers for P.B.X., toll small and medium central office batteries:

Type	Bat. Volts	Charging Rate	Net Prices*
G-30	16 — 25	0.5	$ 38.00
CB-30	16 — 25	1	49.50
CB-50	32 — 50	1	68.00
CM-30	16 — 25	2.5	81.00
CM-50	32 — 50	2.5	117.00
CR-30	16 — 25	5	115.00
CR-50	32 — 50	5	169.00

*F.O.B. North Chicago, Illinois. For complete price list and specifications, write for Bulletin TC-51.

AT THE CONVENTION

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METALLURGICAL CORPORATION

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COMMUNICATIONS and ELECTRONIC Developments

Noise Due to Longitudinal Effects

During the past few years several articles on the subject of noise due to longitudinal current in a telephone line have appeared in technical publications. Because of the importance of this subject some of the high lights of these articles are reviewed here.

Where wires of a telephone line parallel a high voltage transmission line and are not transposed a difference in voltage will appear on the two wires which will cause a circulating noise current. (Referred to as metallic circuit noise.) In order to minimize the noise pickup the telephone line is transposed at periodic intervals. The transposition of the telephone line **equalizes** the induced voltage on the two telephone wires, however, the induced voltages are still present. If any path be provided to ground, either conductive or capacitative, noise current will flow over the two wires towards the ground and this current is known as the **longitudinal current.**

As long as the current is equal or balanced in the two wires it will not cause noise in the connecting subsets. If, however, unequal current flows in the two wires **or the impedance of the two wires are not equal** a difference in voltage will exist in the metallic circuit and a circulating noise current will be set up.

Importance of Circuit Balance

The problem in circuit design is therefore to maintain both circuit and equipment in a balanced condition so that even though longitudinal voltages exist and longitudinal current flow take place it will not be effective in creating noise in the subsets.

That this is and will continue to be an important problem in the average telephone plant, results from the many miles of new R. E. A. multi-grounded Y type rural distribution systems which now parallel rural telephone lines. Because of the high inductive influence of these lines longitudinal voltages are set up on paralleled telephone wires and these induced voltages must be balanced by means of frequent telephone transpositions. However, the longitudinal voltages even though equalized may cause trouble unless the telephone line is maintained free of ground in order to prevent longitudinal current from flowing. Or if a ground connection is necessary as for example in a C. B. cord circuit, then the impedance of the two sides of the circuit must be kept equal to prevent a transfer of the current in the longitudinal circuit into the metallic circuit. Typical sources of unbalance are: cord circuits, subsets, repeating

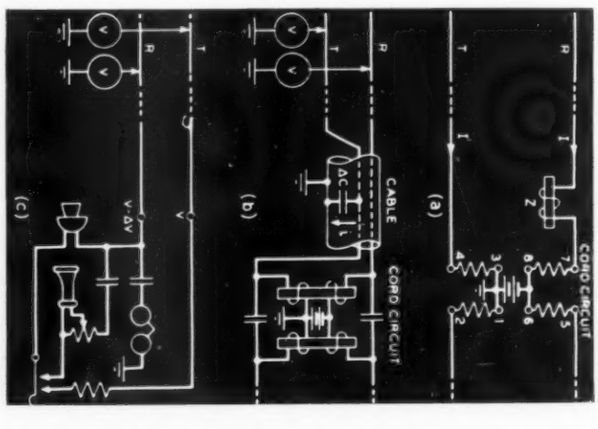

Fig. 1 — Sources of Longitudinal Unbalance in Telephone Circuits. (Courtesy Bell Laboratories Record.)

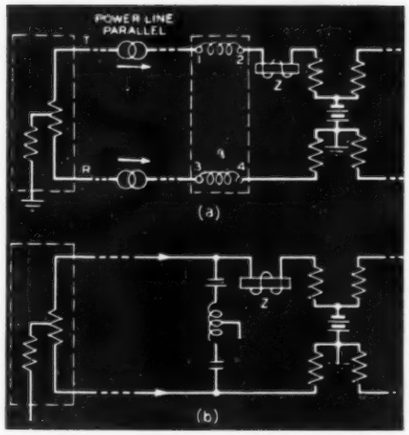

Fig. 2—Remedial Measures for Reducing Longitudinal Current Flow Effects. (Courtesy Bell Laboratories Record.)

coils, tree leaks and even cable pairs. Figure 1 illustrates three sources of unbalance. In Figure 1-A the supervisory relay in the cord circuit is shown as a source of unbalance. The added impedance of the relay in one side of the line causes a voltage drop due to the longitudinal current flowing toward the grounded battery feed cord circuit which in turn results in a transfer of longitudinal current to the metallic circuit with a consequent interfering effect to normal telephone conversation. In Figure 1-B a cable pair which has one wire with a greater capacity to the sheath than its mate causes unbalanced currents to be set up which results in noise in the metallic circuit. The ordinary subset which operates with larger connection ground is also a source of unbalance and a frequent cause of noise. Old style repeating coils with line windings which are not uniformly found may be a source of longitudinal unbalance and consequent noise.

Minimizing Longitudinal Effects

One method of controlling longitudinal currents that has been utilized to some extent is to insert balanced choke coils in the two line wires. These coils are wound in such a manner that they offer a high impedance to currents flowing in the same direction through the two wires but a low impedance to currents flowing in opposite directions, hence, they tend to reduce the magnitude of unbalanced longitudinal currents but at the same time permit the steady flow of the normal voice current through the coil. The effectiveness of the choke coil method of suppressing a longitudinal current flow depends largely on whether or not the voltages which exists on the telephone line are due to magnetic or electric induction. When due to magnetic induction the method is quite effective inasmuch as the impedance of the coupling link between telephone line and power line is relatively low, hence the high impedance of the choke coil is very effective in suppressing the longitudinal noise current that would tend to flow. If however, the voltages are due to electrostatic induction the impedance path between the high voltage power line and adjacent telephone line is quite high and the choke coil will not be effective. In such cases some relief can often be obtained in bad induction situations by the use of a drainage coil. Figure 2 illustrates these two remedial measures for minimizing the effects of longitudinal induction. Often times longitudinal current flow may be so bad in a telephone line that it requires the insertion of a repeating coil between the unbalanced equipment and the open wire line. This is an effective means of suppressing longitudinal current as a good repeating coil will reduce the longitudinal current flow to virtually zero and unless a conductive path is required between the open wire line and the C. O. equipment no particular advantage accrues from the use of the repeating coil.

From a practical standpoint it is well to remember that where a telephone line is noisy and it is suspected that it is due to unbalanced C. O. equipment a simple test can be made by temporarily inserting a repeating coil in the line preferably at the junction of the open wire and cable, or in the central office M. D. F. jumper.

Increase Telephone Use In Railroad Operation

A continued rise in the use of the telephone in directing train operations, as constrasted with the telegraphic services, was recorded in 1941, it was reported to the annual convention of the Telegraph and Telephone Section of the Association of American Railroads at Cincinnati Sept. 22. Train operations on 148,676 miles of railroads, or more than 66 percent of the total railway mileage of the United States, are being directed by telephone—this was an increase for telephone service of 428 miles since Jan. 1, 1940.

The telegraph is now being used for train orders on 83,116 miles as compared with 85,107 miles on Jan. 1, 1940. William A. Fairbanks, secretary of the Telephone and Telegraph Section, stated that there were a number of reasons why the telephone was supplanting the telegraph in train dispatching, the chief causes being the telephone information is transmitted with greater ease and in less time with instantaneous checking by voice of receipt of train orders. The telegraph had been practically exclusively the method employed up to 1908.

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Telephone Cable... Paper Insulated and Leaded

ROEBLING makes available a wide variety of electrical wires and cables to meet practically every telephone and telegraph need. In addition to those shown, Roebling makes:—Parallel Telephone Wire ...Rubber Insulated and Braided, Bare Copper and Bronze Wire, Bare Galvanized Steel Wire, Galvanized Steel Strand.

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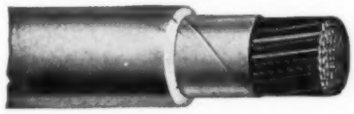

Telephone Switchboard Cable.... Silk and Cotton Insulated and Leaded

Twisted Pair Telephone Wire.... Rubber Insulated and Braided.

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ONLY A FINE PRODUCT MAY BEAR THE NAME ROEBLING

Charles C. Potwin Dies

Charles C. Potwin, nationally known acoustic consultant for Electrical Research Products Inc., died September 25 of phlebitis at the Park East Hospital, New York City, following a two-week illness. During his professional career he was responsible for the acoustic design of the Temple of Religion and the A. T. & T. Building at the New York World's Fair, the new Kleinhans Music Hall in Buffalo, the auditorium of the Methopolitan Museum in New York, as well as many others. His contributions to architectural design based on acoustic principles have been hailed in leading professional journals as spectacular advances in the science.

McKernan Named To New Defense Post

John F. McKernan, until recently chief of equipment in the production division of the OPM, has returned to Western Electric in the newly-created post of manager of defense program planning, charged with coordinating production on the Company's $100,000,000 defense job, it was annouced Sept. 26 by Frederick R. Lack, manager of Western Electric's Specialty Products Division at Kerney, N. J.

Mr. McKernan, making Kearny his headquarters, will set up an organization which will intergrate defense production with the manufacture of telephone apparatus for the Bell System, guaranteeing efficient use of all current plant capacities at the Company's Works at Point Breeze, Baltimore, Md.; and Chicago; as well as Kearny.

As veteran of more than twenty years' service with Western Electric, Mr. McKernan was program planning manager at New York headquarters from 1935 to 1937, and merchandise manager at the Point Breeze plant until early this year, when he went to the OPM. George R. Logan, associated with Mr. McKernan briefly in Washington, and previously in the Western Electric organization, will serve as his lieutenant at Kearny.

Telephones In Assembly Lines

So that its employees working both inside and outside the fuselages of planes under construction can communicate with each other without the necessity of crawling in and out, the Republic Aviation Corp. has installed telephones in its assembly jigs.

—FLASH—

The Senate Interstate Commerce Sub-committee, October 2 recommended the enactment of legislation to permit the merger of telegraph companies, particularly Western Union and Postal Telegraph. In regard to the proposal to place the Bell System telegraphic and T.W.X. services in the telegraph industry, the Senate and Sub-committee recommended that this should be eventually done as far as commercial handling of services by the merged telegraph companies, but that such a step should not be taken during the war emergency if it cause interference or impairment of defense communications.

The F.C.C. is expected to draft legislation to be submitted to Congress later in October.

PROTECTED AGAINST DECAY

The empty cell creosoting process employed in making "Black Beauty" Poles insures them against infections and other causes of decay.

You can depend on

"BLACK BEAUTY" POLES

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Whether you require new facilities or need to improve your present plant we shall be glad to assist.

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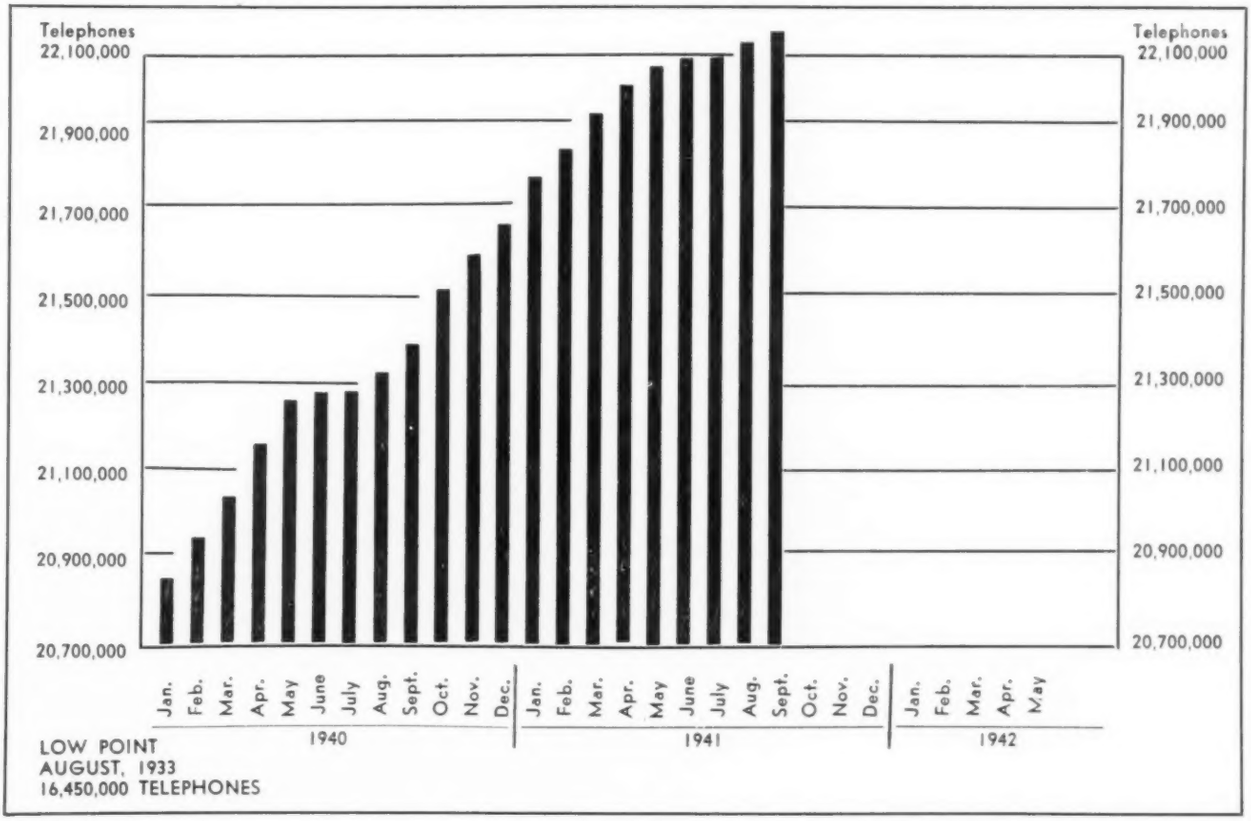


Approves Phone Rate Hike

JEFFERSON CITY, Mo.—The state public service commission recently rejected telephone rate increases proposed by the Central Missouri Telephone Co. for its customers at Warrensburg, but approved higher schedules covering the company's exchanges at Lexington, Holden and Sweet Springs.

UNINTERRUPTED SERVICE

with Non-Grounding Rare Gas Arresters

Used for many years by leading Railroads for vital Telephone, Telegraph and Signal Circuits.

Type MCD (illustrated) interchangeable with your present carbon block protectors.

Write for Catalog 39-A describing
Arresters Anti-Noise Relays
Terminal Strips Potheads Housings

L. S. BRACH Mfg. Corp.
55-63 Dickerson St. Newark, N. J.
Signal Circuit Engineers Since 1906

Communications Readied For Test of Defenses

A huge "pool" of telephone and other communications facilities to coordinate the testing of Eastern seaboard defenses, using thousands of volunteer civilian air-raid observers and the various units of the Air Force, Antiaircraft Artillery and Army, is now under development as plans for the trial "attack" on the Atlantic coast in October reach their final stage.

The communications side of the exercises, to be directed at the vital Eastern and Southern population and industrial centers, is the most important test of telephone facilities in the Army airraid warning tests yet staged. A tremendous assemblage of voice telephone facilities and teletype circuits, together with hundreds of specially trained operators and plant employees, is being prepared. The "attack" on the area from Massachusetts to North Carolina is scheduled for Oct. 9-16, while the Carolinas and Georgia will be under fire Oct. 20-25.

The American Telephone and Telegraph Co. and Bell System companies in the respective regions of the two Interceptor commands—the New England Tel. & Tel., Southern New England, New York Telephone Co., New Jersey Bell of Pa., Diamond State Telephone Co., Chesapeake and Potomac and Southern Bell—will be the major cogs in the communications facilities' furnishing, directing and supplying practically all of the service. Several important Independent telephone companies, such as Carolina Telephone & Telegraph, also will furnish special services and facilities. Western Union and Postal Telegraph also will supply any needed equipment.

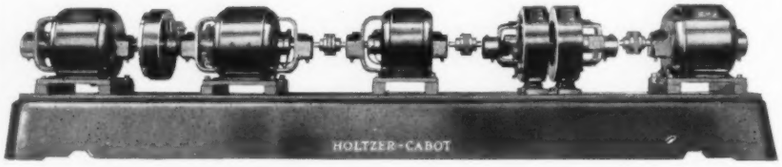
In the First Interceptor Command Exercise, Boston, New York, Philadelphia and Norfolk will be the Information Centers and Harrisburg and Baltimore will have Filter Centers—all of them to have a large amount of extra talking circuits and teletype facilities. In the Second Interceptor Command Charleston, S. C., Charlotte and Raleigh, N. C., will be Filter Centers. Most of the operations in the air warning exercises will be carried in the day, although there will be some limited night operations.

Appointed By W. N. Matthews

Maurice C. Sellers, Chicago, whose specialized advertising service has been well known for many years in the field, has been appointed Central District Telephone Sales Representative for the W. N. Matthews Corporation, St. Louis, Missouri. Announcement of Mr. Sellers' appointment, which was effective October 1st, was made by Mr. M. C. Cooley, Vice-President of the Matthews Corporation. His territory covers New York State and West to Minnesota, Iowa, Missouri and all in-between states.

Maurice C. Sellers

Mr. Sellers will continue to carry on his regular advertising service in addition to his new duties as the Matthews representative. His offices are at 205 W. Wacker Drive. The W. N. Matthews Corporation is the manufacturer of Matthews Scrulix Anchors, Stazrite guy guards, Telefaults, Teleheights, slack pullers, adjustable reels, cable splicing joints, wire clips and telephone connectors which have been widely used by the telephone industry for many years.



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A complete line of telephone ringing equipment available.

Let HOLTZER-CABOT engineers help solve your ringing problems.

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New Series No. 100

- Automatic Door Switch for Lights and Electric Ventilators.
- New Silent Electric Ventilator.
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- Accoustically Designed.
- New Structural Features for More Rigidity and Longer Life.
- NO FLOOR!

Write for further data and prices

Manufactured by

CHURCHILL CABINET CO.

Chicago, Illinois

Telephone Engineer

HANDBOOK TABLES

By B. C. Burden

File—General Data
Date—October 15—1941

Subject—COMPARISON OF THE VARIOUS WIRE GAUGES

General

The wires in use in the telephone field are classified as to size either by their diameter in **mils**, or by their wire **gauge No.** Some confusion results from the fact that several different wire gauges are in use. Iron and steel wire is generally specified in the B.W.G. (Birmingham) gauge, hard drawn copper by the N. B. S. (New British Standard) gauge, soft drawn copper wire by the B. & S. (Brown and Sharpe) gauge. There is a trend toward the use of the mil equivalent, for example No. 12 B. W. G. iron wire is referred to as 109 iron wire. The table below gives a comparison of actual size in mils of the various gauge wires for each of the several gauges.

No.	Brown & Sharpe	Old English or London	Stubbs' or Birmingham	New British Standard
0000	.460	.454	.454	.400
000	.40964	.425	.425	.372
00	.36480	.380	.380	.348
0	.32495	.340	.340	.324
1	.28930	.300	.300	.300
2	.25763	.284	.284	.276
3	.22942	.259	.259	.252
4	.20431	.238	.238	.232
5	.18194	.220	.220	.212
6	.16202	.203	.203	.192
7	.14428	.180	.180	.176
8	.12849	.165	.165	.160
9	.11443	.148	.148	.144
10	.10189	.134	.134	.128
11	.09074	.120	.120	.116
12	.08081	.109	.109	.104
13	.07196	.095	.095	.092
14	.06408	.083	.083	.080
15	.05706	.072	.072	.072
16	.05082	.065	.065	.064
17	.04525	.058	.058	.056
18	.04030	.049	.049	.048
19	.03589	.040	.042	.040
20	.03196	.035	.035	.036
21	.02846	.0315	.032	.032
22	.025347	.0295	.028	.028
23	.022571	.027	.025	.024
24	.0201	.025	.022	.022
25	.0179	.023	.020	.020
26	.01594	.0205	.018	.018
27	.014195	.01875	.016	.016.4
28	.012641	.0165	.014	.014.8
29	.011257	.0155	.013	.013.4
30	.010025	.01375	.012	.012.6
31	.008928	.01225	.010	.011.6
32	.00795	.01125	.009	.010.8
33	.00708	.01025	.008	.010.
34	.0063	.0095	.007	.009.2
35	.00561	.009	.005	.008.4
36	.005	.0075	.004	.007.6
37	.00445	.0065	—	—
38	.003965	.00575	—	—
39	.003531	.005	—	—
40	.003144	.0045	—	—

DOUBLE EFFICIENCY WITH THIS COMBINATION

Double leverage action of pulley gives the Bartlett Combination Tree Trimmer and Pole Saw extra power. Head sections 30" over all. Easily converted from pruner to tree saw for cutting larger limbs. Can be lengthened by adding extra sections to the head section. Pole Saw has 16" curved blade. Poles are straight grained Sitka spruce with interlocking sections and treated to prevent moisture absorption.

Now available in 3 combinations 4'—6' or 8' intermediate and bottom sections with 30-in. top sections.

No. 1—WE Pike Pole Attachment: For use with No. 1-WE Combination described above. Fits extra sections, and self-locking sleeve holds pike securely in place when testing poles.

NEW LINE CLEARING SAWS

Make fast-clean-easy cuts and are easy to file.

AN AID TO GOOD PUBLIC RELATIONS —BARTLETT TREE PAINT

Bartlett Tree Paint protects tree wounds. Applied with ordinary paint brush. Non-injurious to cambium layer. Will not freeze.

$1.50
1 Gal. Can
$5.50
5 Gal. Drum
F.O.B. Detroit

WRITE FOR OUR NEW CATALOG NO.27

BARTLETT MFG. CO.
3052 East Grand Blvd. Detroit, Michigan

New Instrument for Measuring Ground Resistance

Fig. 1—Kearney Ground Resistance Meter.

THE measurement of the resistance to earth of the driven and buried electrodes used in the telephone field is occasionally required in the larger telephone systems. It is particularly desirable that central office grounds offer low resistance to the flow of current into the earth.

In cities where the common neutral type of power distribution systems has resulted in considerable noise induction into telephone cables and where the use of low resistance sheath grounds has been used as a remedial measure, a knowledge of electrode earth resistance is very important.

The James R. Kearney Corporation has recently developed and placed on the market a **Ground Resistance Meter** which is well adapted to telephone ground measurements and is remarkably easy to use.

The new instrument is shown in Figure 1. By an ingenius circuit direct current is converted into alternating current which passes through the electrode under test, thus avoiding errors due to polarization, galvanic action and stray earth currents. Its theory of operation is as follows:

Three leads from the instrument are connected to the electrode under test and to two auxiliary electrodes as shown in Figure 2.

Current from a self-contained 45 volt battery flow into the ground through electrode X and back to the instrument through electrode S. This flow acts as a direct current on the current coil of the ohmmeter movement. It will be observed that although this current passes through the current coil always in the same direction that it passes through the ground electrodes as an alternating current due to the action of a hand driven revolving current alternator. The alternating voltage which is developed between electrode X and P due to the action of the current alternator is converted into a dc voltage by the action of the voltage rectifier which is mounted on the same shaft as the current alternator, hence acts on the voltage coil of the ohmmeter movement the same as a DC voltage. The two coils of the ohmmeter movement are differentially wound, hence the reading will be proportional to the $\frac{E}{I}$ ratio. The scale is calibrated in ohms and by means of a multiplier switch the instrument has a useful range of 0 to 2000 ohms.

In using the instrument it is only necessary to turn a small crank on the side of the case and the unknown resistance can then be read directly from the scale in ohms.

In using the instrument the spacing between the three electrodes should not be less than 50 feet. By means of a simple change in connections the Kearney Ohmmeter can be used as an ordinary ohmmeter.

Fig. 2—Circuit of Kearney Ground Resistance Meter.

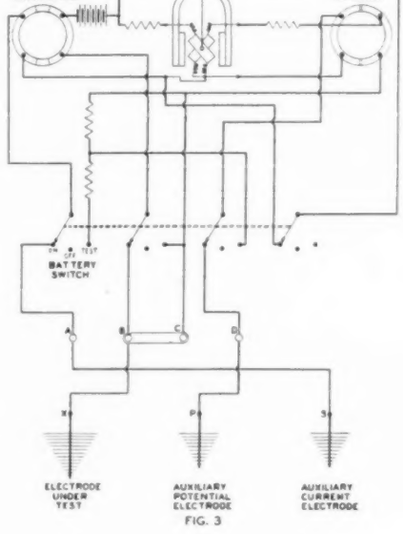

FIG. 3

U. S. Rubber Exhibit To Depict Army Work

IN recognition of the outstanding services rendered by the United States Army Signal Corps, many of whose members have been drawn from the ranks of independent telephone companies, United States Rubber Company announces that its exhibit at the USITA Chicago convention has been designed to portray the work of the Corps.

The interior of room No. 2554 in the Stevens Hotel, headquarters for the meeting, will be transformed into an artillery battalion command post in a battle-occupied sector. Details of a staff headquarters will be reproduced, with actual Signal Corps telephone equipment operating. An appropriate motion picture will also be presented.

U. S. Rubber has designed a special latex insulation for telephone wire to be widely used by the Signal Corps. It is produced by a continuous vulcanization process and will be devoted to the service of the telephone industry in the future. The new wire has many advantages for telephone use, according to the company.

Because of small overall diameter it is less conspicious and is said to have greater resistance to ice, sleet, snow, and wind loads. Since it is light in weight, it is easier to handle and install, and may be erected with longer spans.

Company officials who will be present at the convention will include C. W. Higbee, manager of wire sales, Kemp Haythorne, in charge of special defense work for the company, W. T. Keenan, manager of mechanical goods sales in the Chicago branch and Fred H. Pinkerton, manager of sales promotion.

Stanley Bracken Named General Mgr. of Manufacture

Vice President William F. Hosford of the Western Electric Company, announced September 29 the appointment of Stanley Bracken as General Manager of Manufacture, effective October 1st. This is a new office in the Company made necessary by the great increase in its manufacturing activities.

Mr. Bracken has a record of 29 years service with Western Electric, having started after graduation from the University of Nebraska in 1912 as a student engineer in the Hawthorn Works. He has held many responsible positions in the business and is at present its Engineer of Manufacture. His home is in Maplewood, New Jersey.

Kellogg Switchboard Signs Wage Contract

Officials of the Kellogg Switchboard and Supply Company met in Washington with officials of the International Brotherhood of Electrical Workers, Local No. B-713 and the International Association of Machinists, District No. 8, representing the American Federation of Labor, before the National Defense Mediation Board to conclude a contract originally signed by all parties last May 19th, 1941. This conference was for the purpose of setting up wage classifications and wage scales applicable thereto.

These negotiations have been carried on in a very amicable manner during which time there has been no labor trouble of any kind, neither has there been any threat of strike or shutdown.

Mr. Louis B. Sauer, Vice President in charge of Manufacturing, stated that all parties concerned, have expressed satisfaction over the result of these negotiations which has now culminated in a contract running for one year.

Last May the Company granted a wage increase of 10%, vacations with pay, double time for Sundays and holidays, together with extra compensation to employees working on night shifts.

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Cook Announces New Trans-Mount System

RECENT announcement by Cook Electric Co., engineers of the perfection of the Trans-Mount System of protection and distribution marks the end of a long period of research that had as its purpose the development of a completely interchangeable system of inside and outside plant protection and cable termination and distribution.

For months Cook engineers have sought the answer to the problem of greater flexibility and complete standardization in protection and distribution equipment. In announcing the Trans-Mount System of protection and distribution, Walter C. Hasselhorn, president of the Cook company, said:

"We feel that in the development of the Trans-Mount System we have created those features of equipment flexibility and standardization that will mean greater economies in time and labor and at the same time greater efficiency, better service and less maintenance, all at lower cost."

According to the company, the Trans-Mount System provides central office protection and cable termination; substation protection for subscriber drops and instruments; cable and subscriber drop protection and distribution at the pole; and protection for small cables and

(Please turn to next page)

Celebrates 100th Birthday at John A. Roebling's Sons Plant

THE 100 Anniversary celebration of the John A. Roebling's Sons Company was held in Trenton, New Jersey, Friday, September 19. William A. Anderson, who has been president of the Roebling concern since 1936, served as host to a selected invitation list including many industrial leaders from the entire United States. The program covered the entire day with the **piece de resistance** being a speech by Leon Henderson, Washington, D. C.

The Trenton Evening Times, one of the leading newspapers in Trenton, carried an entire Roebling section in their issue of Friday, September 19, in which the entire history of the Roebling concern was outlined. Their rotogravure section of the Sunday, September 21, issue devoted several pages to illustrations showing growth of the company to its present world wide importance. News reel representatives from the movie industry released pictures for their regular program showing shots of a machine breaking four inch wire rope in the Roebling laboratories. This news reel was shown at all RKO theatres throughout the United States.

It's a pleasure to us here at TELEPHONE ENGINEER to join with concerns all over the country in congratulating the Roebling concern over their achievements during the past century.

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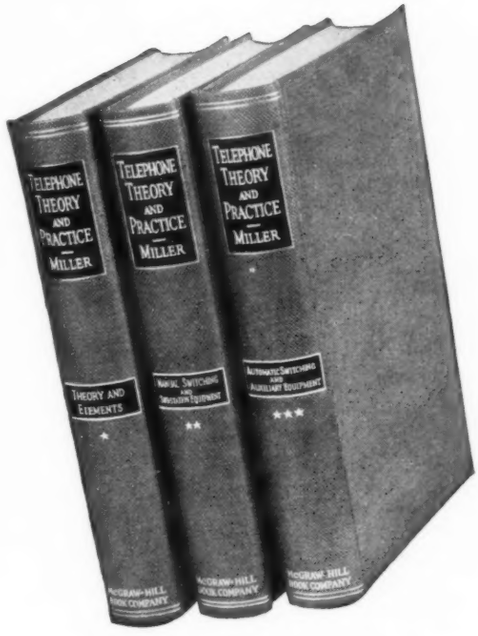

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Here are three books that can be obtained together or separately, which give a complete treatment of telephone practice, covering everything from simple fundamentals of telephone science and theory to construction and operation of technical equipment and apparatus used in telephony. Features of these books are the clear, understandable treatment; the simple language employed; and the profuse illustrations with drawings and photographs of actual apparatus and circuit diagrams.

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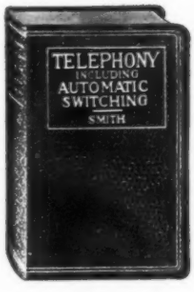

This book thoroughly covers telephonic speech transmission, with special emphasis on automatic switching, which demand up-to-date treatment. The following brief outline shows the scope of work: The magneto receiver, local and common batteries, instruments, private lines and exchange, multiple and "feature" switchboards, automatic switching and telephone instruments, 100, 1000 and 10,000 line exchange, large city systems, private automatic exchange, power plants, testing and adjustment, toll, phantom circuit, loading of lines, measured service and index.

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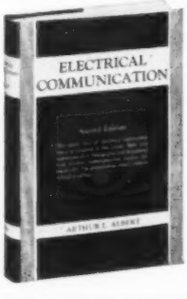

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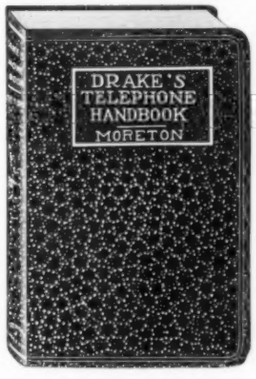

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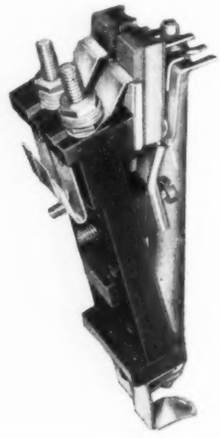
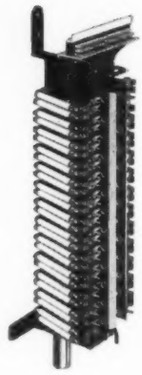
open wires at railroad crossings and power line cross-overs and parallels. Trans-Mount is also adaptable to a variety of special communication applications. It is said to be especially suitable for small and medium-size exchanges and for use in factory and office PBX systems, unattended exchanges and for military communication.

An outstanding feature of the Trans-Mount System is the fact that it enables the maintenance of protection requirements with standardized equipment using a single type of interchangable protector unit, the Cook Type H Trans-Mount protector unit.



Type H Trans-Mount protector unit.



Type T main distributing frame and central office protector mounting.

It is explained by Cook engineers that the protector unit is a new designation for the Cook H20 protector mount. The use and interchangeability of the Type H unit in all divisions of the Trans-Mount System provides quick and economical interchangeability.

The four apparatus divisions of the Trans-Mount System are the Type T main distributing frame and central office protector mounting, furnished in 26, 52 and 104-pair sizes; the Type S-20 pole cable terminal, and protector mounting, furnished in 6, 11, 16 and 26-pair sizes; the Type R sub-station protector mountings, one for outdoor use with bracket and hood and one without hood for indoor use; and the Type U utility and sub-station protector mounting.

Cook engineers point out that the use of the same standard protector unit in all apparatus divisions of the Trans-Mount System means greater economies through bulk purchasing of units and no loss of investment due to idle future growth production equipment. Only those units required need be installed in the Trans-Mount System.

Following is a detailed description of each of the apparatus divisions of the new system:

The Type T main distributing frame and central office protector mounting is for the protection, distribution and cross-connection of paper wrapped, lead covered cable. No silk and cotton switchboard cable tip is required on the end of the outside cable.

It is equipped with a moisture-proof, roomy but compact steel corebox with a

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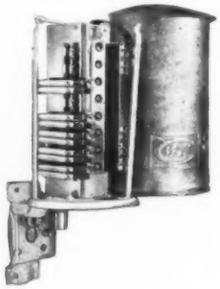
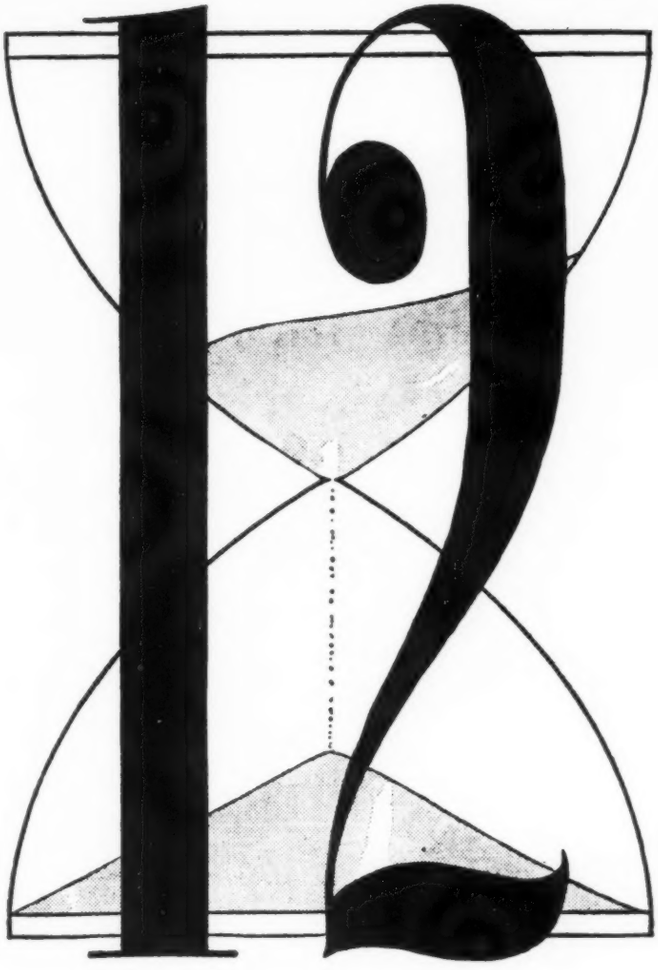


Type S-20 pole cable terminal and protector mounting.



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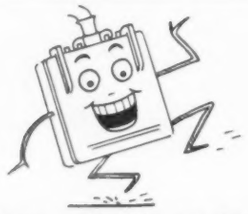

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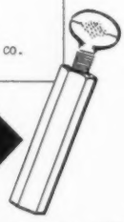

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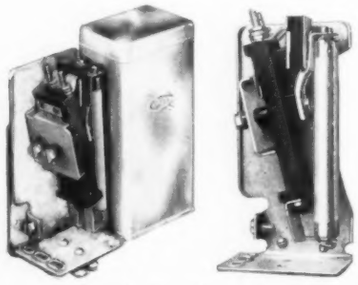
rubber gasketed steel cover, conserving space and facilitating installation and handling. Other features include: A metal fanning strip with insulating bushings in fanning holes; a white designation strip for quickly and clearly numbering pairs; a self-soldering nozzle, which insures tight cable sheath joints; rubber covered rings for neatly distributing cross-connection jumpers; solder clips for both ends of jumpers, and strong, rigid wall-mounting brackets.

The Type H protector mounts in the Type T provide primary protection with fuse and high potential discharge and secondary high potential protection after fuse has blown, it is said. Non-corrosive studs and washers, phosphor bronze springs and clips and patented high potential dischargers are standard. The Type T is finished in black crackle enamel.

The Type S-20 pole cable terminal and protector mounting is already in use, and is used as a part of the Trans-Mount System.



Types RO and RI sub-station protector mountings.

The self-soldering nozzle of the S-20 is located to bring the cable close to the pole and behind the subscribers' drops. The mounting base is open at the back to prevent accumulations of ice, dirt or moisture, it is claimed. A separate mounting bracket shaped to fit the pole is provided for installation without gaining the pole. Drop wires enter the terminal through an insulating panel with knockouts.

In order to insure orderly arrangement of drop wires, metal fanning strips with insulating bushings are located in front of the cable chamber. All metal parts are non-corrosive. The sealing plate of the cable chamber is easily removed from the front.

All connections of the S-20 are at the front, the self-soldering nozzle lies close to the pole, the separate mounting bracket

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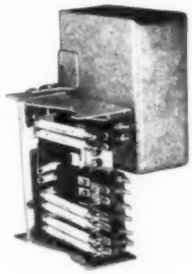

Type U utility and sub-station protector mounting.

is shaped to fit the pole, a strong guide holds the hood securely in raised position for working ease, and drops are taken out through knockouts in an insulating plate to prevent the entrance of birds, insects, etc., it is pointed out.

The all-steel, hot dip galvanized, moisture-proof, roomy but compact corebox, the bracket and hood and all normally non-current carrying parts are grounded. The corebox may be fitted with more than one nozzle to eliminate splices in loop distribution. A deep trough for next laying of jumpers is also a feature of the S-20.

The Type R sub-station protector mounting is available for two applications: the Type RO for outside mounting on post, wall, etc., is equipped with bracket and Endurite coated weatherproof hood and the Type RI (without hood) is for inside mounting. A heavy steel bracket replaces the usual porcelain member.

The high insulating value and great tensile strength of the quality moulded bakelite used in the Type H mount gives the Type R sub-station protector mounting higher resistance to breakage from the shocks of severe electrical discharges, and greater physical strength and durability, it is said.

Type R sub-station protector mountings are equipped with heavy studs for connecting wires and ground. All structural parts of both and the hood and bracket of the Type RO (for outside use) are grounded.

The Type U utility and sub-station protector mounting has a variety of uses in the outside plant. It provides protection for small cables and open wires, up to five pairs per unit, at railroad crossings and power line cross-overs and parallels. It is especially valuable for the protection of subscribers' drops where several instruments are closely grouped. It is an entirely new Cook protection product and completes the Trans-Mount scheme of inside and outside plant protection and cable termination.

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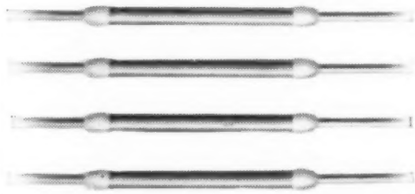

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The Type U is a compact, convenient unit, and consists of a sturdy, hot galvanized steel base fitted with non-corrosive studs on which as many as five Type H protector units may be mounted. A heavy galvanized hood and insulated entrance holes in the base make the entire unit weather and insect-proof, it is claimed. Mounting brackets are so arranged that the base unit may be brought to a horizontal position to facilitate wire connections. When connections are completed the entire unit is raised and secured in its permanent vertical position.

A dramatic visualization of the application of Trans-Mount System units will be shown at the USITA Convention in the Cook exhibit room.

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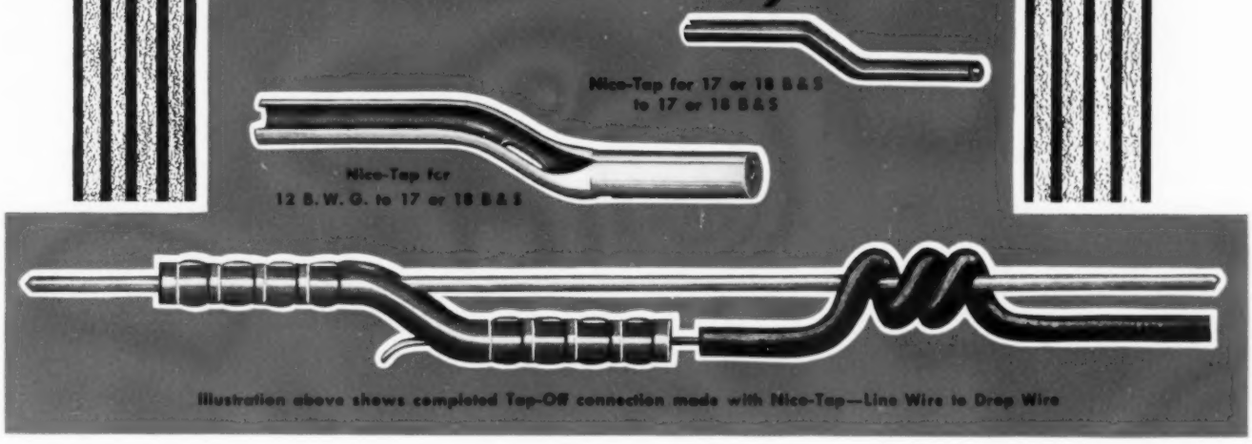
NATIONAL Announces Another New Nicopress Development

—Nico-Tap—


Nico-Tap for 17 or 18 B & S
to 17 or 18 B & S
Nico-Tap for
12 B. W. G. to 17 or 18 B & S
Illustration above shows completed Tap-Off connection made with Nico-Tap—Line Wire to Drop Wire

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Here is a new sleeve of special shape and design, manufactured to meet an insistent demand for a Nicopress Sleeve that would increase efficiency in making tap-off connections.

The Nico-Tap is split its entire length so that there is no need of cutting the line to make the connection—just slip the sleeve over the line wire and compress.

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